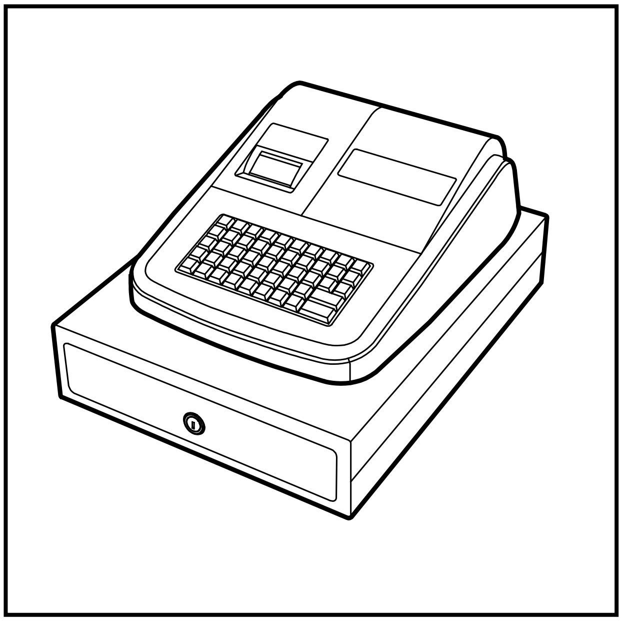
SAM4S

ELECTRONIC CASH REGISTER

ER-180U SERIES

SERVICE Manual

ELECTRONIC CASH REGISTER



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About this Manual

This service manual describes how to perform hardware service maintenance for the SAM4S ER-180U Series Electronic Cash Register.

Notes

Notes may appear anywhere in the manual. They describe additional information about the item.

Precaution symbols

⚠. Indicates a Safety Precaution that applies to this part component.

⚠. Indicates the part or component is an electro-statically sensitive device. Use caution when handling these parts.

License details

FreeRTOS

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SAM4S ER-180U SERIES

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Overview of this ECR

This ECR is a microprocessor-based system, using an 32-bits ARM Cortex-M3 microprocessor.

This service manual provides the technical information for many individual component systems, circuits and gives an analysis of the operations performed by the circuits. If you need more technical information, please contact our service branch or R&D center. Schematics and specifications provide the needed information for the accurate troubleshooting.

All information in this manual is subject to change without prior notice. Therefore, you must check the correspondence of your manual with your machine. No part of this manual may be copied or reproduced in any form or by any means, without the prior written consent of Shin Heung Precision.

Note: Before using this Electronic Cash Register (ECR) for the first time, leave it powered on in the REG mode for at least 24 hours. This allows the MS Lithium battery, which maintains the memory of the ECR while the power is off, to charge completely.

"Proper disposal of batteries is required. Refer to your local codes for disposal requirements."

1 Precaution Statements

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock.

1-1 Safety Precautions

1. Be sure that all built-in protective devices are replaced. Restore any missing protective shields.
2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including nonmetallic control knobs and compartment covers.
3. Make sure there are no cabinet openings through which people - particularly children - might insert fingers and contact dangerous voltages.
   Such openings include excessively wide cabinet ventilation slots and improperly fitted covers and drawers.
4. Design Alteration Warning:
   Never alter or add to the mechanical or electrical design of the ECR. Unauthorized alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.
5. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or over- heating, and correct any potential hazards.
6. Observe the original lead dress, especially near the following areas: sharp edges, and especially the AC and high voltage supplies.
   Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC/DC adaptor for damage. Make sure that leads and components do not touch thermally hot parts.
7. Product Safety Notice:
   Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they give might be lost if the replacement component differs from the original - even if the replacement is rated for higher voltage, wattage, etc.

   Components that are critical for safety are indicated in the circuit diagram by shading, (⚠) or (⚠). Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

Dispose used batteries according to the manufacturer's instructions.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.

Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

1-2 Servicing Precautions

WARNING: First read the-Safety Precautions-section of this manual. If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.
WARNING: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet. Follow them.
2. Always unplug the units AC/DC adaptor from the AC power source before attempting to:
   (a) Remove or reinstall any component or assembly
   (b) Disconnect an electrical plug or connector
   (c) Connect a test component in parallel with an electrolytic capacitor
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
5. Always connect an instrument’s ground lead to the instrument chassis ground before connecting the positive lead ;
   Always remove the instrument’s ground lead last.

1-3 Precautions for Electrostatic Sensitive Devices (ESDs)

1. Some semiconductor (solid state) devices are easily damaged by static electricity. Such components are called Electrostatic Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.
2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power - this is an electric shock precaution.)
3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
4. Do not use freon-propelled chemicals. These can generate electrical charges that damage ESDs.
5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.
6. Use only an anti-static solder removal device. Many solder removal devices are not rated as anti-static; these can accumulate sufficient electrical charge to damage ESDs.
7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
9. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

2 Product Specifications

Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

2-1 General Specification

A. System Specifications

Item	Description	Remark
Processor	• NXP CPU LPC1519JBD100E,32-Bit,ARM Cortex-M3	
Memory	• DATA SRAM : 96KBytes (Serial-EEPROM) • PGM EEPROM : 256KBytes (CPU Internal)	
Battery	• Type : MS Lithium, 3.0V 5.5mAh • Part Name : MS621FE-FL11E • Charging Time : 24 Hours • Life : 2 Years	Rechargeable
Data Storage	• 90 Days	When battery is fully charged
Printer	• Model : LTP01-245-01 (SII) • Print Speed : 65 mm/sec • Type : Thermal dot line printing type	Detail Spec refers to next page
Display	• Operator Display : 8 Digits LED • Customer Display : 8 Digits LED #Option	
Keyboard	• Max. 48 Keys Raised-I (w/o cap) • Max. 48 Keys Raised-II (with cap) #Option	
Drawer	• B-type (3B4C, 4B4C) • Bplus-type (3B4C, 4B4C) #Option • G-type (5B5C, 4B8C, 5B8C) #Option • Compulsory switch #Option	
Consumption	• Max. : 11W Reg. : 7W	
Power Requirement	• Adaptor DC7.5V/2.5A (Input : AC 100~240V / 50~60Hz)	
Environment Condition	• Temperature : 0 ℃ ~ 45℃ • humidity : 30% ~ 80% RH	
Dimensions(mm)	• 420(L) X 325(W) X 202(H) • 450(L) X 400(W) X 218(H)	With B-Drawer & Bplus Drawer With G-Drawer (Option)
Weight	• 3.8Kg (SET only) • 8.1Kg (SET only)	With B-Drawer & Bplus Drawer With G-Drawer (Option)

Table2-1 General Specifications

2-1 General Specification

B. Printer Specification

Item		Description	Remark
Model		• LTP01-245-11 (SII)	
Print Method		• Thermal Direct Line Printing	
Printing Format	Total Number of Dots	• 384 Dots	
	Dot Pitch	• Vertical : 0.125 mm • Horizontal : 0.125 mm	
Printing Speed		• 65mm/Sec (8 Dot)	
Printing Direction		• Unidirectional friction feed	
Paper Feeding	Feeding Method	• Friction Feed	
	Minimum Feed Pitch	• 0.0625 mm	
	Feeding Speed	• 65 mm/Sec (At 7.5V of motor voltage)	
Power Supply Volt	Power Voltage	• 4.2~9.5V (Recommend)	Head/Motor
	Circuit Input Voltage	• 3.3V	Head Control/Sensor
Printer Head	Heat Element Density	• 8 Dots/mm (0.125mm/Dot ; 200 dpi)	(1step 0.0625mm)
	Total Head Elements	• 384 Dots/Dot Line	
	Available Printing Width	• 48 mm	
Line Feed Motor		• 2-2 Phase Bi-Polar Stepping Motor	
Sensor	Head Temperature	• Thermistor	
	Paper-End Sensor	• Reflection type photo interrupter	
Reliability	Life	• 50km or more	
Dimension (mm)		• 70.3 (W) ×32.7 (D) ×15.3 (H)	
Weight		• Approx. 44 g	

Table2-2 Thermal Printer Specification

C. Paper Specification

Item	Description	Remark
Paper Type	• Single-ply Thermal Paper Roll	
Paper Size	• 1 station 57.5 ±0.5 mm (Width) × diameter Ø 80 mm or less	
Specified Paper	• Original Paper No : HPK-110 (Hansol paper XT)	

Table2-3 Paper Specifications

Note: The following paper can be used instead of the specified paper above.
TF50KS-E: Nippon paper industries Co.,Ltd.
PD 160R : New Oji paper Mfg, Co.,Ltd. , F380 : Kansaki specialty papers, Inc. (USA)

D. Character Specification

Item	Description	Remark
Character Structure	• 12(W) × 24(H) Font (Including a horizontal)	
Character Size	• 1.5 mm(W) ×3.0 mm(H)	
Column Pitch	• 2.0 mm	
Line Pitch	• 3.5 mm (Including 8-dot line spacing)	
Number of Column	• 24 (12×24 Dots/Character)	

Table2-4 Character Specification

2-2 Appearance

A. Appearance Dimensions (mm)

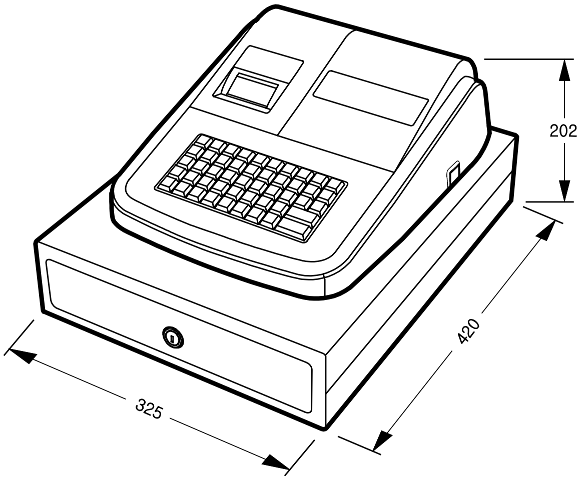
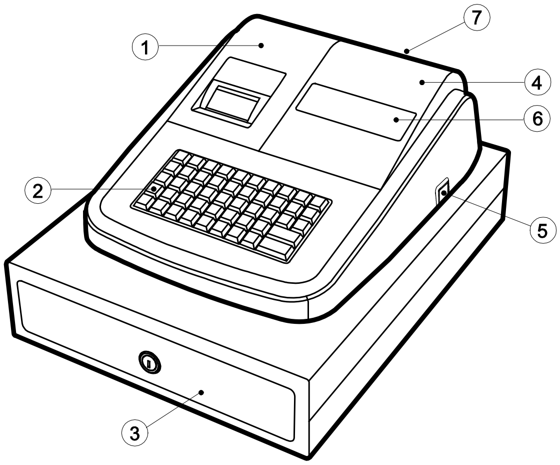


Figure2-1 Dimensions

B. ECR Features



① Cover Printer
② Key Board
③ Cash Drawer
④ Cover Display
⑤ Power Jack
⑥ Front Display
⑦ Rear Display(Option)

Figure2-2 Location Feature

Memo

3 Installation and Operation

WARNING: Before using Electronic Cash Register (ECR) for the first time, leave it powered ON in the REG mode for *at least 24 hours.* This allows the MS-Lithium battery, which maintains the ECR's memory while the power is OFF, to charge fully.

3-1 Installation

3-1-1. Paper Roll Installation

1. Remove the printer cover.(Fig 3-1 (A),(B))
2. Open the housing clam cover and Insert the paper roll as shown.(Fig 3-1 (C), (D))
3. Pressing the housing clam cover.(Fig 3-1 (E))
4. Lay a cover on the side and press the FEED button.
5. Feed the leading edge of the paper in about 150mm and fold the tip in 20mm. (Fig 3-1 (F))
   Insert the leading edge of the paper into the slot on the Spool Winding. (Fig 3-1 (G),(H))
6. Turn the Spool Winding in 2~3 turns. (Fig 3-1 (I))
7. Place the Spool Winding on the Paper Supply. If it loosen, turn to tighten it. (Fig 3-1 (J))
8. Replace the printer cover.(Fig 3-1 (K))

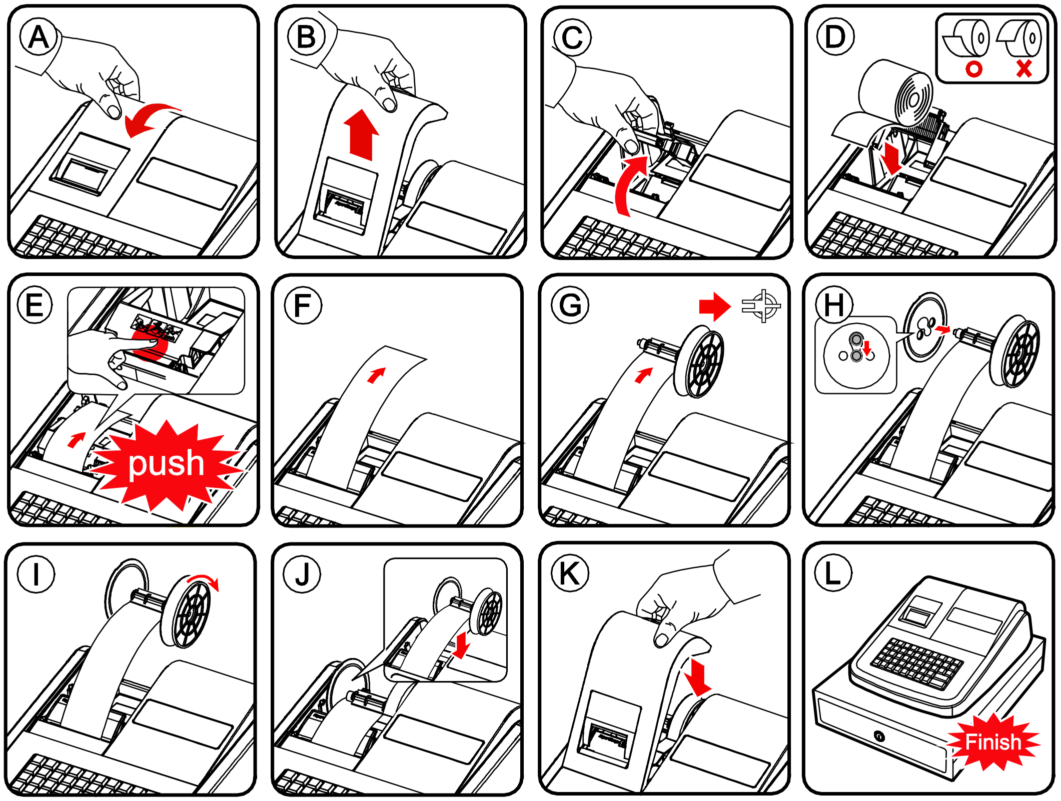
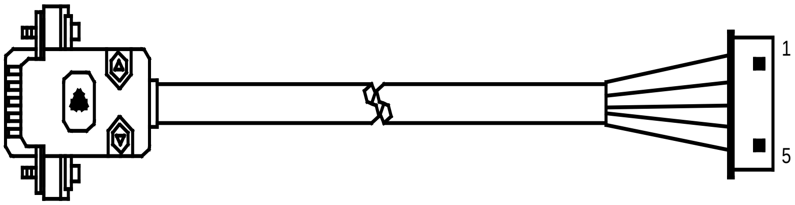
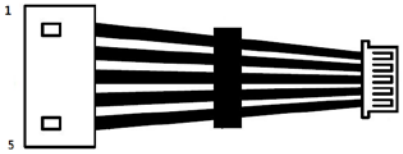
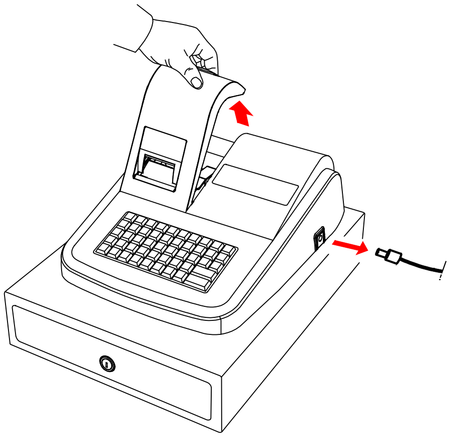
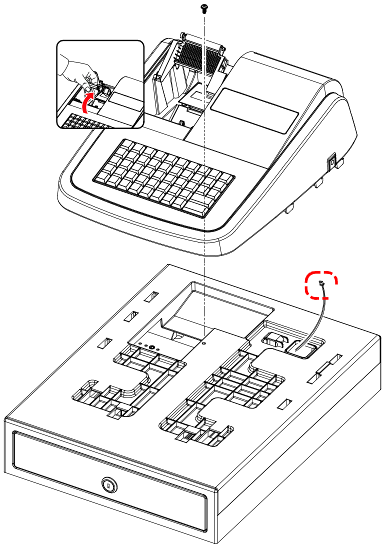


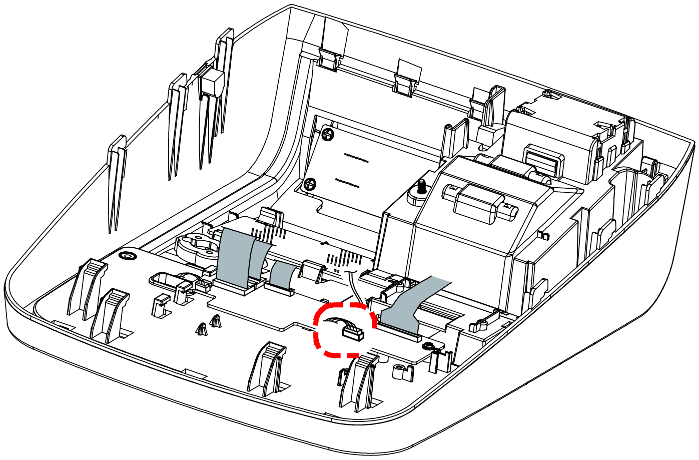
Figure 3-1. Paper Installation and Take-Up Spool Installation

3-1-2. Program Download

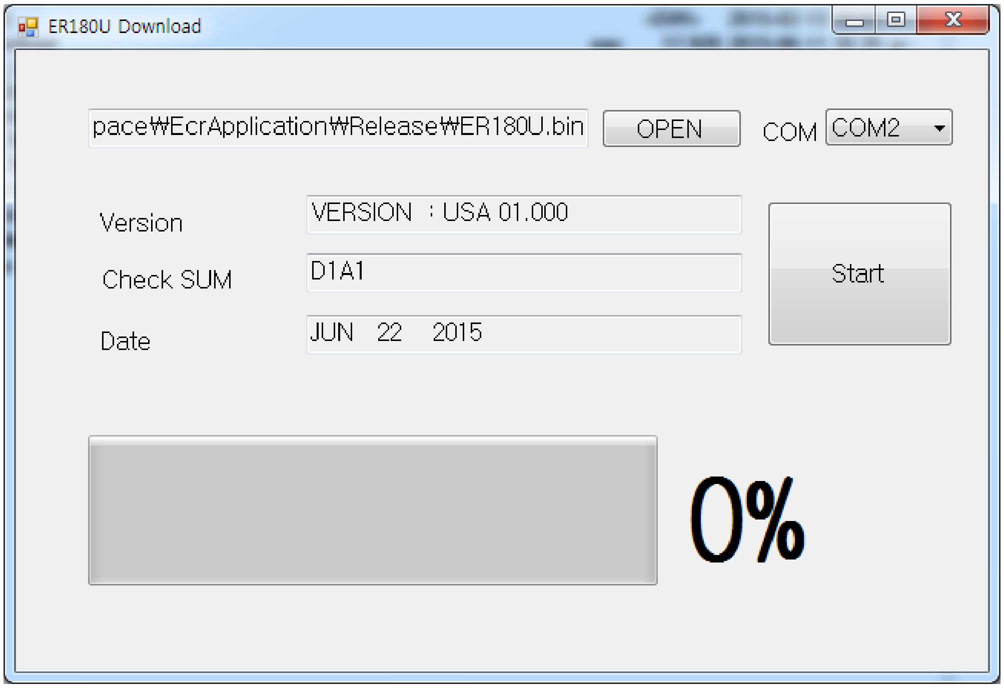
No	□ Description
1	**DOWNLOAD CABLE** for Program Update. (Special Cable for ER-180/180T/180U)  **(DOWNLOAD CABLE)** **CONVERSION CABLE** for Program Update. (Special Cable for ER-180U only)  **(CONVERSION CABLE)**
2	- Separate the DC power cord and cover printer 

3	- Open the housing clam and Remove the screw. - Separate the drawer cable and Remove the drawer. 

3-1-3. Program Download

No	□ Description
4	- Insert the download cable and Insert the DC power cord. 

3-1-3. Program Download

No	Description
5	- Run the ‘ER-180U Download” program.  pace₩EcrApplication₩Release₩ER180U.bin COM COM2 Version VERSION : USA 01.000 Check SUM D1A1 Date JUN 22 2015 0% - Click ‘OPEN’ button to select binary file. If a binary file is selected, Version, Checksum and Date will be displayed. - Choose COM Port of PC and click ‘START’ button. - When download is completed, ‘100%’ will be displayed. - Unplug the DC power cord. - Unplug the download cable - Reassemble drawer and assemble the screw as original status. - Plug the DC power cord. - Do the RAM ALL CLEAR and program other settings again (date and time..)

3-2 Operation

Note: Before using this Electronic Cash Register (ECR) for the first time, leave it powered ON in the REG mode for a at least 24 hours. This allows the Ms-Lithium battery, which maintains the ECR's memory while the power is OFF, to fully charge.

3-2-1 Mode

The position of the Mode determines the action of the ECR. The modes are as shown in Table 3-1

MODE	Number	Display	Function
VOID	1	VOId	Use to void (correct) items outside of a sale.
OFF	2		The Register is inoperable.
REG	3	rEG	Use for normal registrations.
X	4	rEP1	Use to read register reports and perform other manager functions.
Z	5	rEP2	Use to read register reports and reset totals to zero.
P	6	P	Use to program the register.
S	7	S	Use for H/W tests and special setting.

Table3-1 Mode Function

3-2 Operation

3-2-2 Key Board Matrix

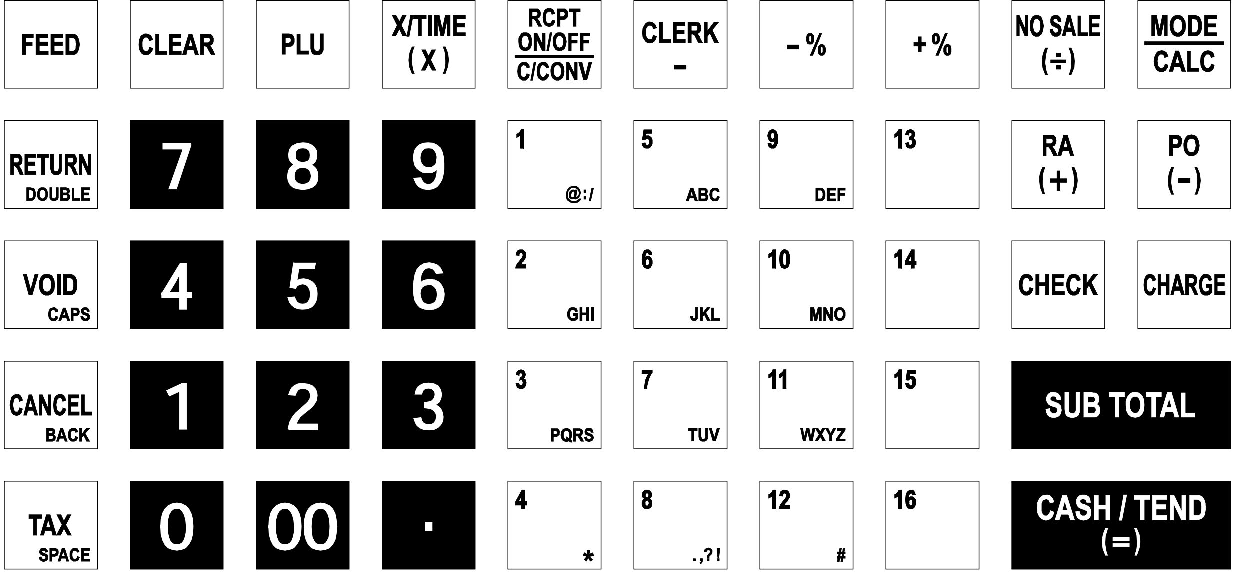


Figure 3-2. Key Board

3-2-3 Initial Clear

1. Unplug the register.
2. Press and hold the key position where the “**SUB TOTAL”** key is located on the default keyboard layout.
3. While continuing to hold the “**SUB TOTAL”** key, plug the register into a power source.
4. The message "****** INITIAL CLEAR ******” prints when the initial clear is complete.

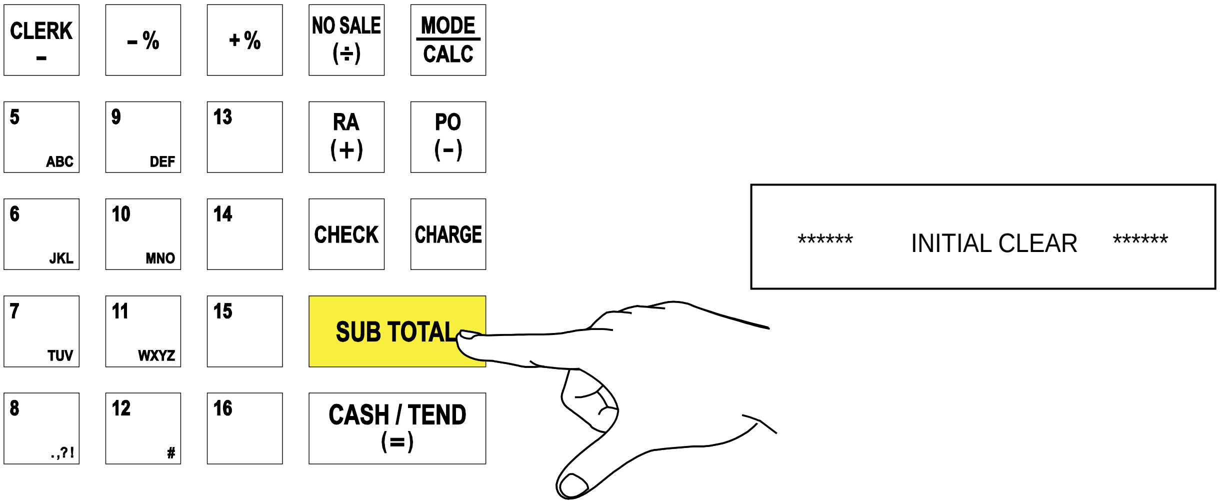


Figure3-3. Initial Clear Key & Print Sheet

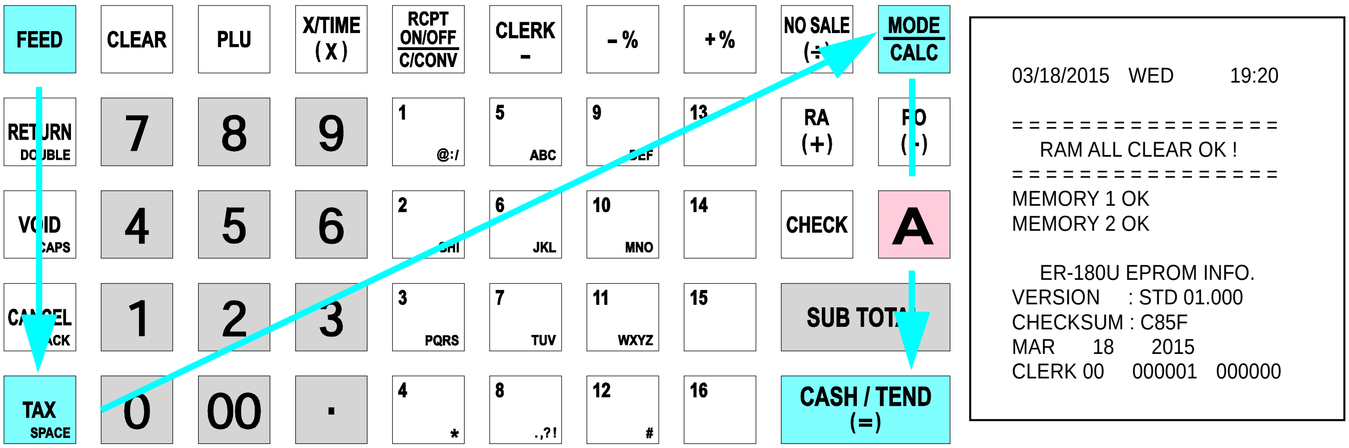
3-2 Operation

3-2-4 All Clear

This step insures that the cash register is cleared of any totals or programming. After this procedure, the cash register is ready for programming and operation.

WARNING:This is a one time procedure. Do not repeat this procedure after the cash register is programmed, it causes all programs and totals to be erased and to be default.

1. Unplug the register.
2. Press and hold the key position where the **"CHARGE"** key is located on the default keyboard layout.
3. Continue to hold the **"CHARGE"** key while plugging the register into a power source.
4. Press the upper left key of the keyboard, then the lower left key, then the upper right key, and finally press the lower right key.



```
03/18/2015   WED          19:20

= = = = = = = = = = = = = = = =
    RAM ALL CLEAR OK !
= = = = = = = = = = = = = = = =
MEMORY 1 OK
MEMORY 2 OK

    ER-180U EPROM INFO.
VERSION     : STD 01.000
CHECKSUM : C85F
MAR      18      2015
CLERK 00     000001   000000
```

Figure3-4. All Clear Key Sequence & Print Sheet

3-2 Operation

3-2-5 Self Test

3-2-5-(a) Test Printer

1. Press ‘7’ and ‘MODE/CALC’key on key board to move to Service Mode.
2. Press ‘**1’, ‘0’** and **‘SUB TOTAL’** key on key board.
3. Then the printer prints the test pattern.
4. After printing, The drawer is opened. Then the printer test is finished.

3-2-5-(b) Test Display

1. Press ‘7’ and ‘**MODE/CALC**’key on key board.
2. Press ‘**1’, ‘1’** and **‘SUB TOTAL’** key on key board.
3. Check the Display.

3-2-5-(c) Test Key Board

1. Press ‘7’ and ‘**MODE/CALC**’key on key board.
2. Press ‘**1’, ‘2’** and **‘SUB TOTAL’** key on key board.
3. Press each key on the keyboard one key at the time.
   As you press each key. The Display shows the quantity of pushed keys.

3-2-5-(d) Test Mode key

1. Press the Mode key on key board.
2. The corresponding Mode name will be showed on the display.

MEMO

4 Assembly and Disassembly

This chapter describes the Disassembly and Reassembly procedures.

WARNING: This ECR contains electro-statically sensitive devices.
Use caution when handling any components in this system.

4-1 Disassembly

CAUTION: Disconnect the ECR from the external power source before Disassembly.

A. Disassembly Procedure

1. Separate the COVER PRINTER ASSEMBLY (①). (Page 5-1)
2. Remove a screw (⑬) on the CASE UPPER (8) and pull it forward and up and then the CASE UPPER (8) will be open. (Page 5-1)
3. Remove the DRAWER CONNECTOR (ⓑ) on the MAIN BOARD (1). (Page 5-1)
4. Separate the DRAWER (C) from the CASE UPPER (8). (Page 5-1)
5. Separate the four harnesses (ⓓ,ⓔ,ⓕ,ⓙ) can be removed from the MAIN BOARD(1).
6. Separate the POWER CONNECTOR (5) from the CASE UPPER (8).
   (Page 5-1)
7. Remove three screws (/ , 0) on the CASE UPPER (8) and Separate the PRINTER ASSEMBLY(;) and MAIN BOARD (1) from the CASE UPPER(8). (Page 5-1)
8. Remove two screws (2) on the COVER DISPLAY (( ) and Separate the DISPLAY BOARD(3), from the CASE UPPER(8). (Page 5-1)
9. Remove three screws (6) on the CASE UPPER (8) and Separate the KEYBOARD(B), from the CASE UPPER(8). (Page 5-1)
10. Separate the COVER DISPLAY(( )from the CASE UPPER(8). (Page 5-1)
11. Separate the HOUSING CLAM( )), the COVER BATTERY(+) and two ROLLER PAPER/END(,) from the CASE UPPER(8). (Page 5-1)

B. Reassembly Procedure

- Reassembly procedure is in reverse order.

Memo

5 Exploded View and Parts List

[Exploded View]

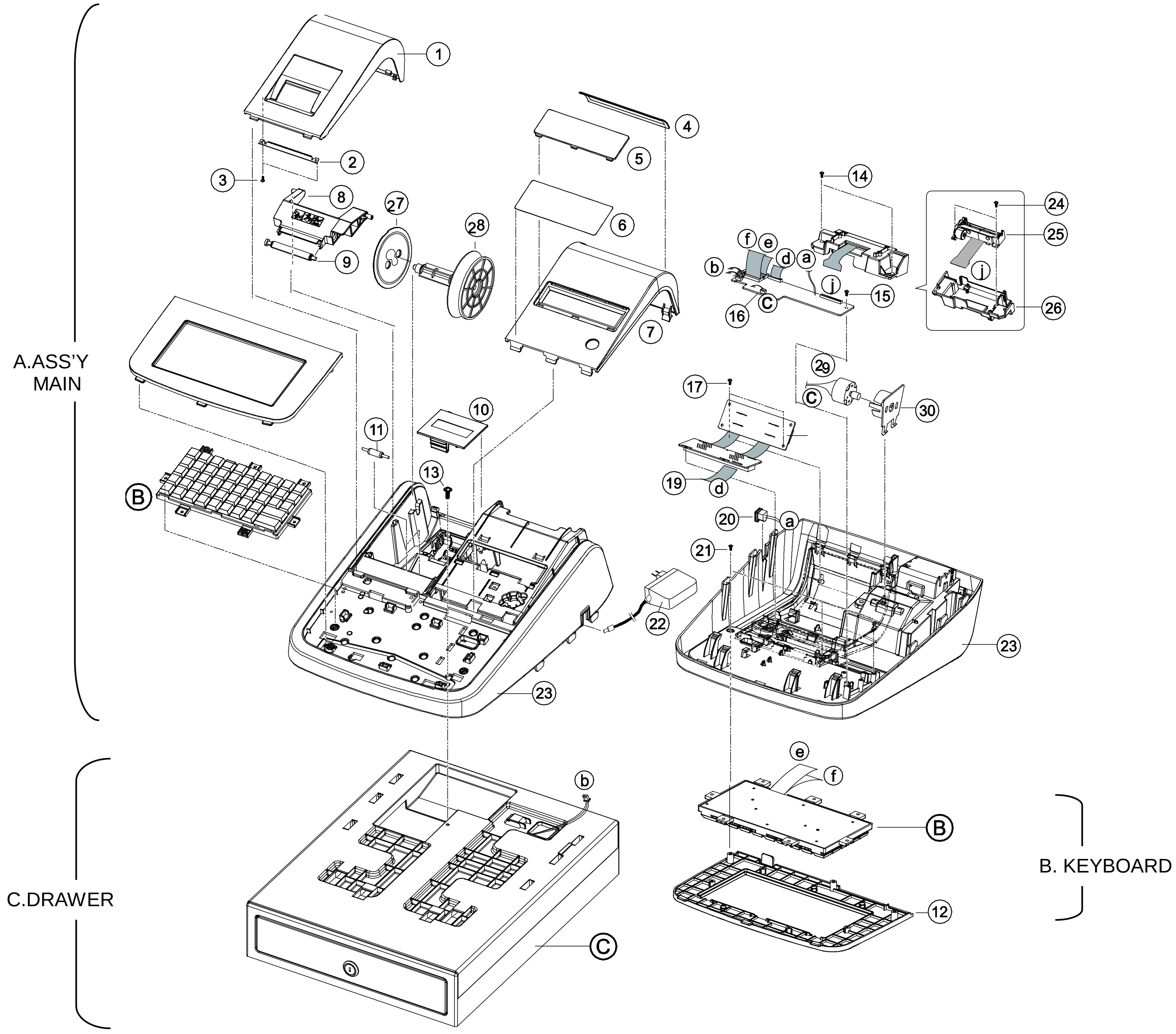


Figure 5-1. Total Disassembly

A. ASS’Y MAIN

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
1	JK72-20379E	PMO-COVER PRINTER	1		Y	
2	JK70-20152A	IPR-CUTTER PAPER	1		Y	
3	S600200016A	SCREW-TAPPING:PH,M2,L4	2		Y	
4	JK72-20385A	PMO-WINDOW REAR	1		Y	
5	JK72-20384A	PMO-WINDOW FRONT	1		Y	
6	JK68-40311A	LABEL(R)-MODE	1		Y	
7	JK72-20378F	PMO-COVER DISPLAY	1		Y	
8	JK72-20383C	PMO-HOUSING CLAM	1		Y	
9	JK81-20004A	AS-PLATEN ROLLER:LTP01-245-01	1		Y	
10	JK72-20377A	PMO-COVER BATTERY	1		Y	
11	JK72-20745A	PMO-ROLLER PAPER/END	2		Y	
12	JK72-20389A	PMO-KBD HOUSING	1		Y	
13	S600200026A	SCREW-TAPPING:PWH,M4,L10	1	C/UPPER+B DRAWER	Y	
	S600300011A	SCREW-TAPTITE:PWH,M4,L10	1	C/UPPER+G DRAWER(OPTION)	Y	
14	S600200005A	SCREW-TAPPING:PWH,M3,L10	2	C/UPPER + PRINTER ASS’Y	Y	
15	S600200005A	SCREW-TAPPING:PWH,M3,L10	1	C/UPPER + MAIN PCB	Y	
16	JK92-10173A	PBA MAIN-BOARD:ER-180U,W/O SPOOL	1		Y	
	JK92-10173C	PBA MAIN-BOARD:ER-180U,WITH SPOOL	1		Y	
17	S600200020A	SCREW-TAPPING;PWH,M2.6,L8	2	C/DISPLAY + R/DISPLAY PCB	Y	
18	JK49-10012B	UNIT-FND DISPLAY:ER-180,DUAL	1		Y	OPTION
	JK49-10012A	UNIT-FND DISPLAY:ER-180,FRONT	1		Y	
19	JK39-40803C	HAR-KBD FFC:NR-300,16P,130mm	1		Y	
20	JK39-80071A	HARNESS-POWER	1	HARNESS-POWER;ER-180U, UL1569#24,2P,280mm,WITH CORE	Y	
21	S600200005A	SCREW-TAPPING:PWH,M3,L10	3	C/UPPER + KBD HOUSING	Y	
22	JK44-10020A	ADAPTOR:EUROPE	1	7.5V/2.5A	Y	
	JK44-10020B	ADAPTOR:USA	1	7.5V/2.5A	Y	
	JK44-10020C	ADAPTOR:AUSTRALIA	1	7.5V/2.5A	Y	
	JK44-10020D	ADAPTOR:UK	1	7.5V/2.5A	Y	
23	JK72-20376E	PMO-CASE UPPER	1		Y	
24	S600200032A	SCREW-TAPPING:PH,M2,L8	2	H/PRINTER + PRINTER	Y	
25	JK59-20003A	UNIT-PRINTER	1		Y	
26	JK72-20381A	PMO-HOLDER PRINTER(T)	1		Y	
27	JK72-20016A	PMO-GUIDE WINDING:ER-5200,BLACK	1		Y	
28	JK72-20015A	PMO-SPOOL WINDING:ER-5200,BLACK	1		Y	
29	JK95-70032D	ELA-MOTOR:ER-180U,STD	1		Y	
30	JK72-20763B	PMO-HOLDER MOTOR:ER-180	1		Y	

B. ASS'Y KEYBOARD (LASER PRINTING TYPE)

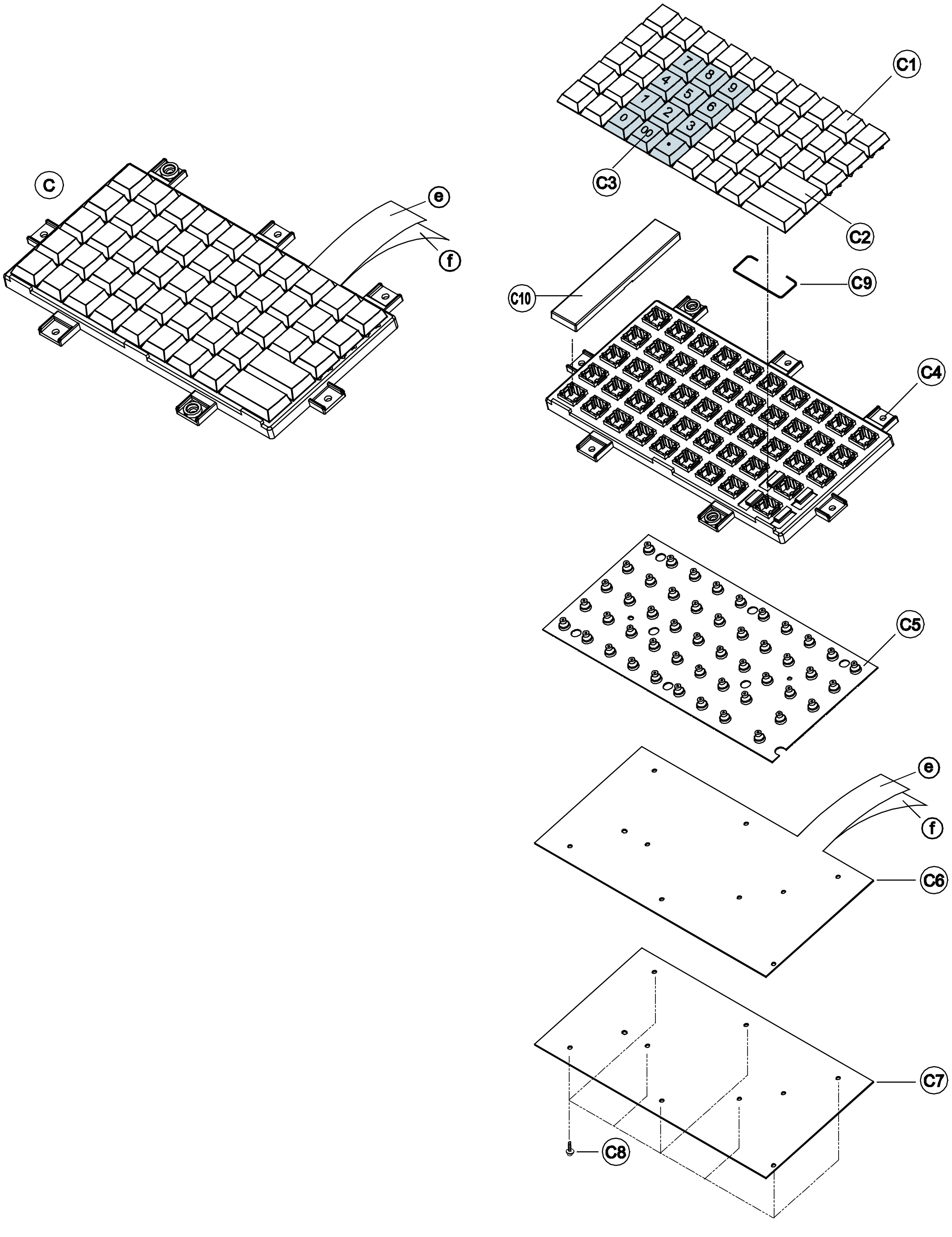


Figure 5-2 ASS'Y KEYBOARD (LASER PRINTING TYPE)

B. ASS’Y KEYBOARD (LASER PRINTING TYPE)

No.	Code No.	Description/ Specification	Q`ty	Design-Location	Serviceable	Remark
C	JK59-30041B	UNIT-KEYBOARD: ER-180T(STD)	1		Y	
C1	JK81-20085A	PMO-KEY TOP 1×1	34		Y	
C2	JK81-20086A	PMO-KEY TOP 1×2	2		Y	
C3	JK81-20094A	PMO-KEY TOP SET:0~9	1		Y	
C4	JK81-20084A	PMO-KEYBOARD FRAME	1		Y	
C5	JK81-20092A	REX-CONTACT RUBBER	1		Y	
C6	JK81-20083A	ASSY-FPC,230	1		Y	
C7	JK81-20091A	IPR-BOTTOM PLATE	1		Y	
C8	JK81-20076A	SCREW TAPPING(BH):M2X5	8		Y	
C9	JK81-20095A	BALANCE-BAR	2		Y	
C10	JK72-20390A	PMO-BLANK KEY TOP	1		Y	

B. ASS’Y KEYBOARD (LABEL TYPE)

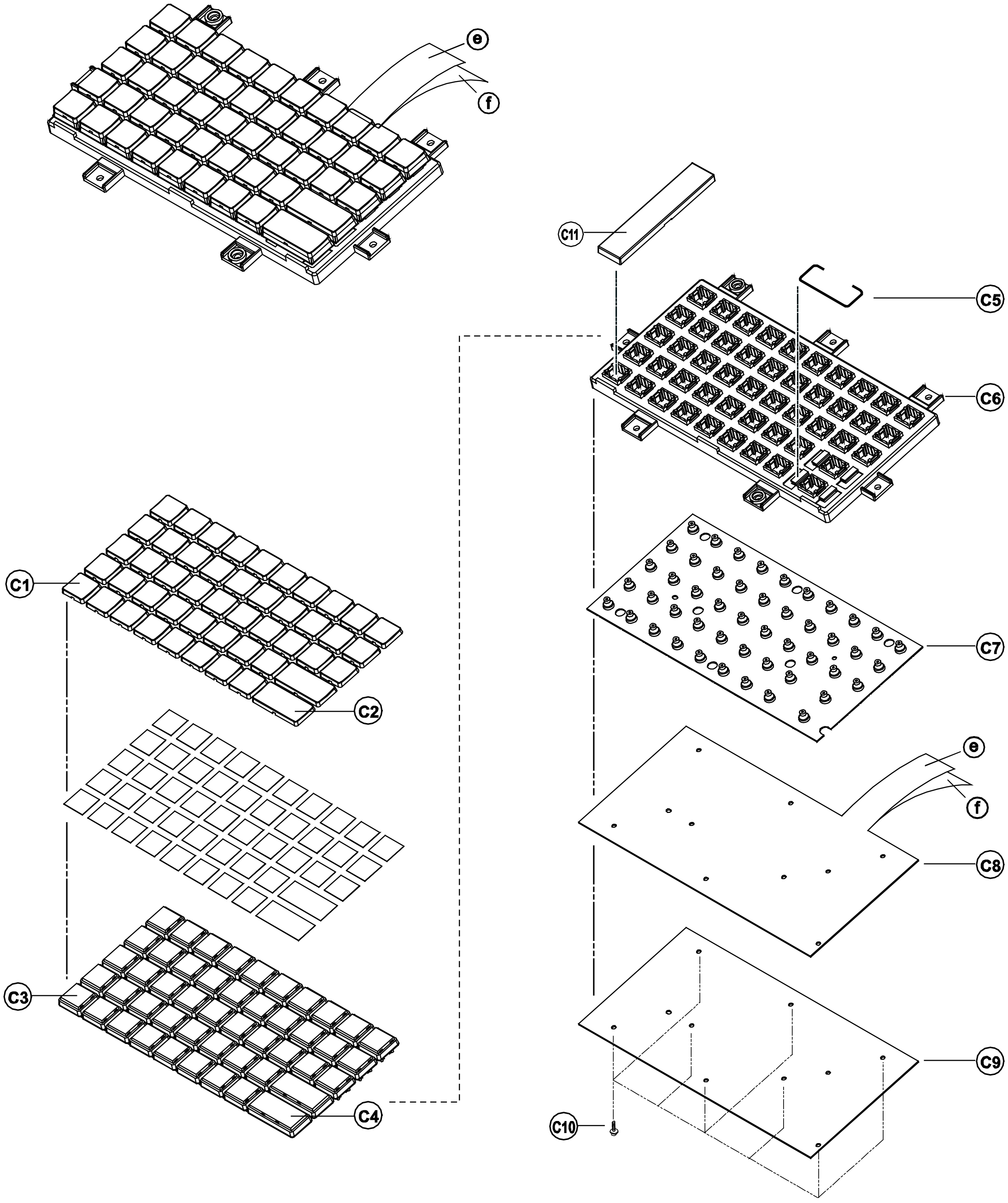


Figure 5-3 ASS’Y KEYBOARD (LABEL TYPE)

B. ASS’Y KEYBOARD (LABEL TYPE)

No.	Code No.	Description/ Specification	Q`ty	Design-Location	Serviceable	Remark
C	JK59-30043N	UNIT-KEYBOARD: ER-180U(STD)	1		Y	
C1	JK81-20089A	PMO-KEY TOP 1×1	46		Y	
C2	JK81-20090A	PMO-KEY TOP 1×2	2		Y	
C3	JK81-20087A	PMO-KEY CAP 1×1	46		Y	
C4	JK81-20089A	PMO-KEY CAP 1×2	2		Y	
C5	JK81-20095A	BALANCE-BAR	2		Y	
C6	JK81-20084A	PMO-KEYBOARD FRAME	1		Y	
C7	JK81-20092A	REX-CONTACT RUBBER	1		Y	
C8	JK81-20083A	ASSY-FPC,230	1		Y	
C9	JK81-20091A	IPR-BOTTOM PLATE	1		Y	
C10	JK81-20076A	SCREW TAPPING(BH):M2X5	8		Y	
C11	JK72-20390A	PMO-BLANK KEY TOP	1		Y	

C. DRAWER (B-TYPE) – BOTTOM

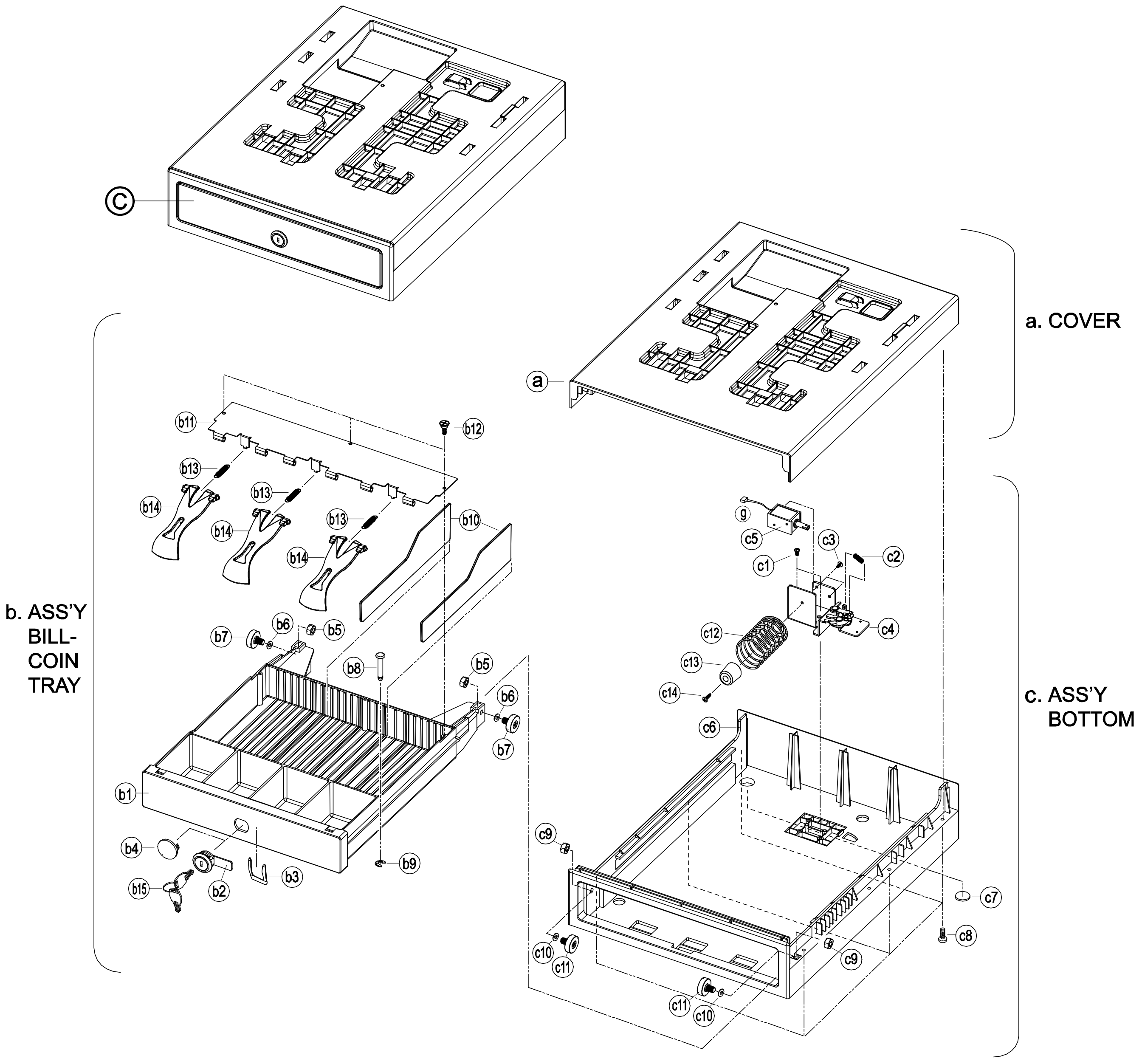


Figure 5-4. B-TYPE DRAWER

C. DRAWER (B-TYPE) – BOTTOM

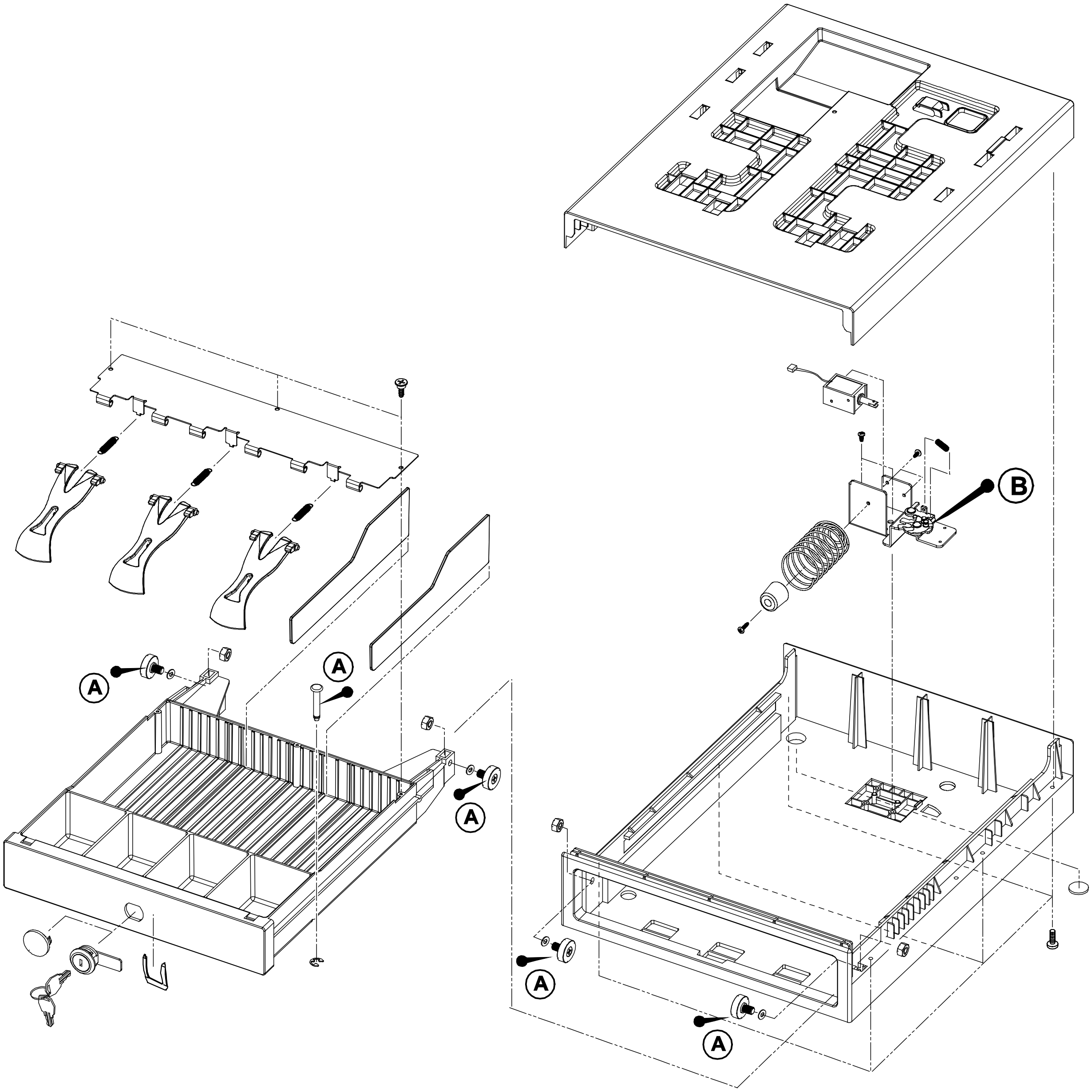


Figure 5-5. Lubrication Points of the B-TYPE Drawer

No.	Code No.	Description / Specification	Q`ty	Serviceable	Remark
A	S020500006A	GREASE-N2	-	Y	Minimum Serviceable Packing Weight : 40g
B	S020500005A	GREASE-N1	-	Y	Minimum Serviceable Packing Weight : 40g

C. DRAWER (B-TYPE) - BOTTOM

DRAWER

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
C	JK75-20104B	MEC-DRAWER B43ND2:3B4C,7V,BLK	1	STEEL LOCK ASS'Y	Y	
	JK75-20105B	MEC-DRAWER B44ND2:4B4C,7V,BLK	1		Y	
	JK75-20097B	MEC-DRAWER B43LD2:3B4C,7V,BLK,KEY	1		Y	OPTION
	JK75-20099B	MEC-DRAWER B44LD2:4B4C,7V,BLK,KEY	1		Y	OPTION

a. ASS'Y COVER

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
a	JK72-20386A	PMO-COVER HOUSING	1		Y	

b. ASS'Y BILL-COIN TRAY

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
b1	JK72-20738C	PMO-BILL_COIN TRAY			Y	
b2	JK75-50004A	MEC-LOCK	1		Y	OPTION
b3	JK70-20314A	IPR-PLATE CLIP	1		Y	OPTION
b4	JK72-20790C	PMO-DRAWER BUSHING KEY	1		Y	
b5	S602100002A	NUT-HEXAGON	2		Y	
b6	S603100002A	WASHER-PLAIN	2		Y	
b7	JK75-50002A	MEC-ROLLER(Ø19)	2		Y	
b8	JK70-70150A	ICT-SHAFT PIN	1		Y	
b9	S604400003A	RING-E	1		Y	
b10	JK72-20737C	PMO-BILL PARTITION	3(4)		Y	
b11	JK70-20119A	IPR-PLATE HOLDER_B3	1		Y	
	JK70-20120A	IPR-PLATE HOLDER_B4	1		Y	
b12	S600200007A	SCREW-TAPPING :RH,M3,L6	3		Y	
b13	JK70-30045A	SPRING-LEVER PRESS(MD)	3(4)		Y	
b14	JK72-20259A	PMO-LEVER PRESS	3(4)		Y	
b15	JK70-20025B	IPR-KEY DRAWER	1		Y	OPTION

c. ASS'Y BOTTOM

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
c	JK97-20093K	MEA-UNIT LOCK(7V)	1		Y	
	JK97-20093L	MEA-UNIT LOCK(7V,COM)	1		Y	
c1	S600100013A	SCREW-MACHINE: M3,L14	2		Y	
c2	JK70-30043A	SPRING-LOCK LEVER	1		Y	
c3	S600300024A	SCREW-TAPTITE: M3,L5	2		Y	
c4	JK95-70265B	MEC-SUB LOCK	1		N	
c5	JK59-50019C	SOLENOID-DC: 7V	1		Y	
c6	JK72-20789C	PMO-COVER BOTTOM	1		Y	
c7	JK73-11023A	FOOT	2		Y	
c8	S600200006A	SCREW-TAPPING	6		Y	
c9	S602100002A	NUT-HEXAGON	2		Y	
c10	S603100002A	WASHER-PLAIN	2		Y	
c11	JK75-50002A	MEC-ROLLER	2		Y	
c12	JK70-30019A	SPRING-PUSH	1		Y	
c13	S603100012A	PLAIN-WASHER	1		Y	
c14	S600300027A	SCREW-TAPTITE: M5,L10	1		Y	

C. DRAWER (G-TYPE)

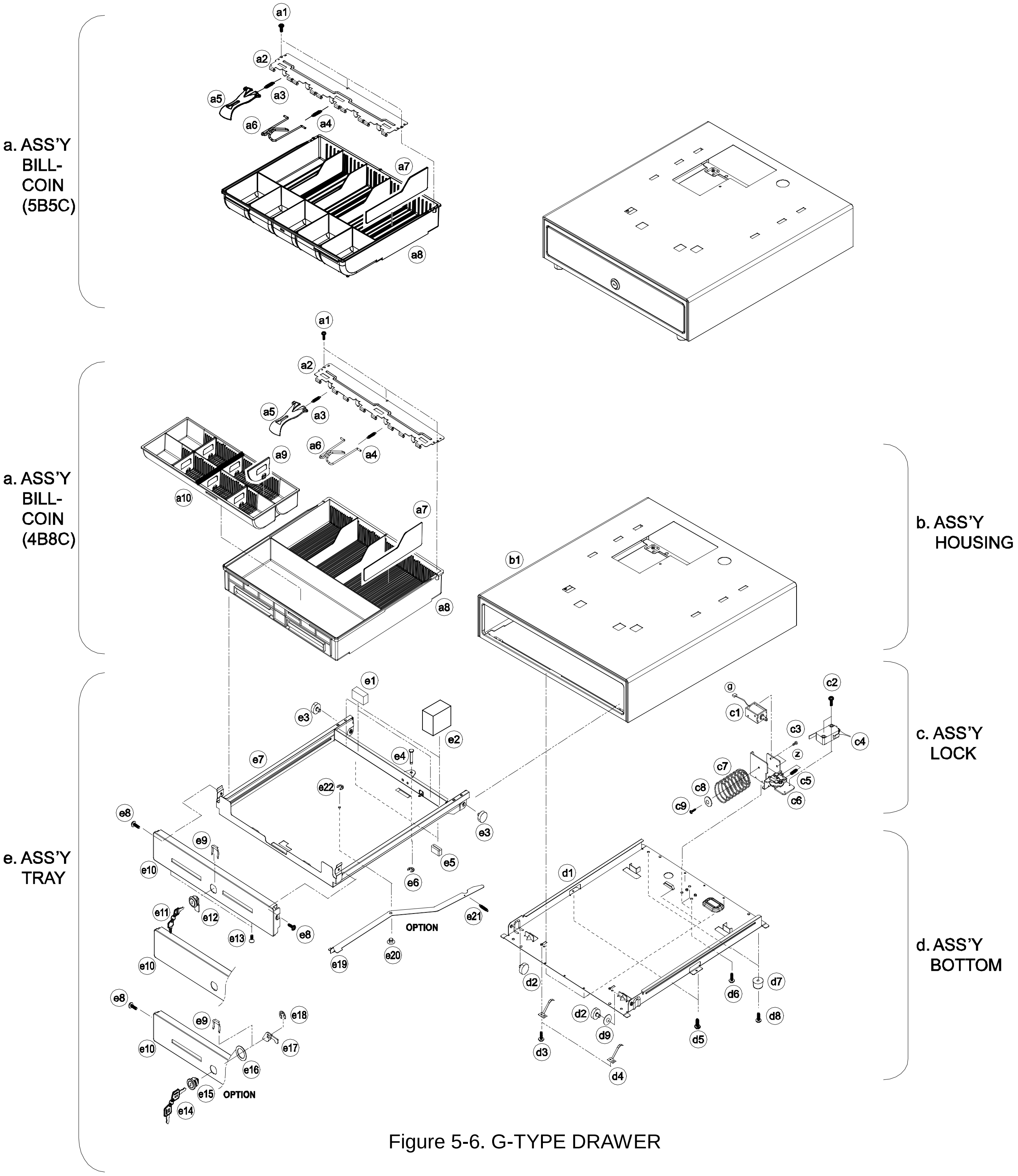


Figure 5-6. G-TYPE DRAWER

C. DRAWER (G-TYPE)

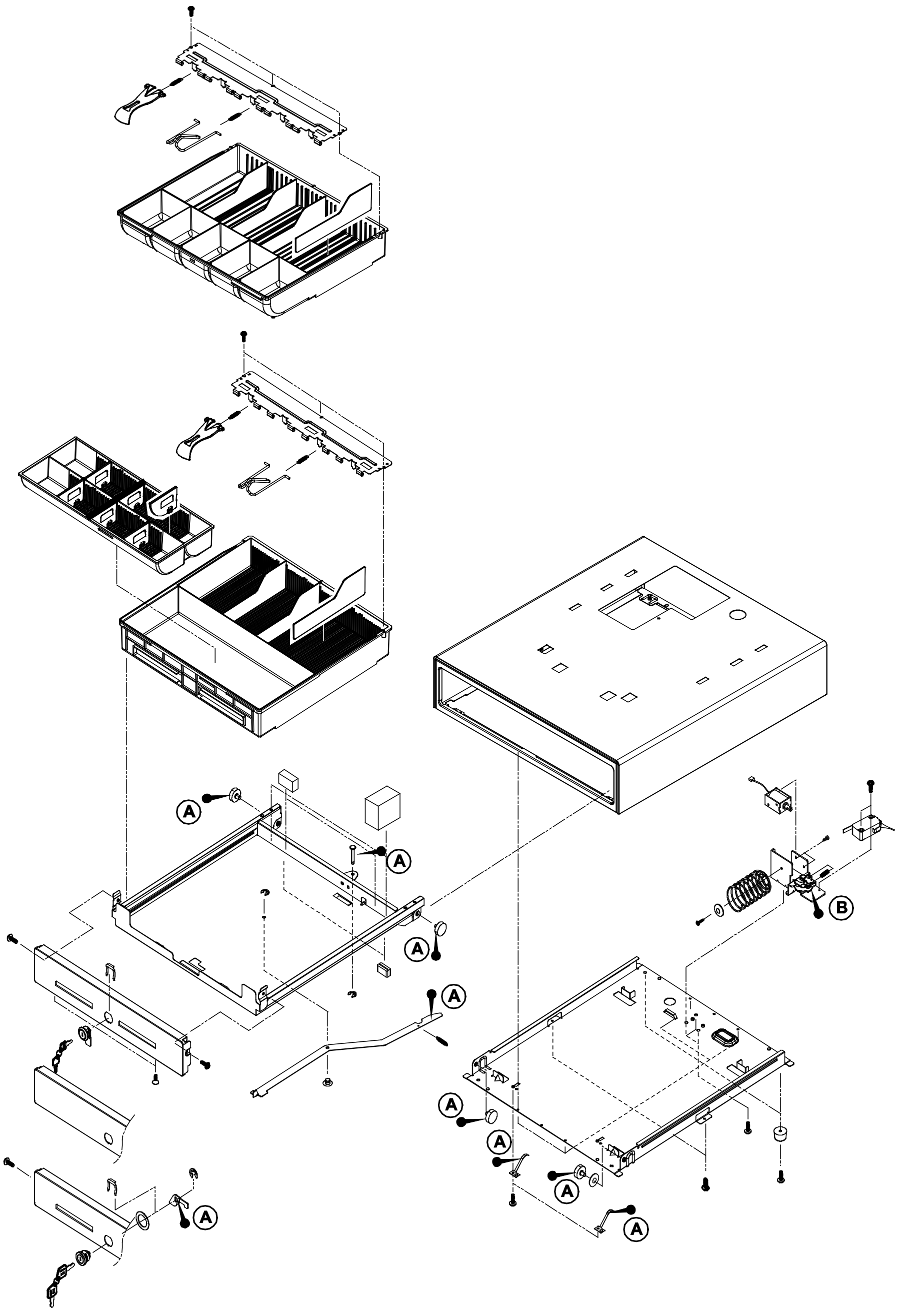


Figure 5-7. Lubrication Points of the G-TYPE Drawer

No.	Code No.	Description / Specification	Q`ty	Serviceable	Remark
A	S020500006A	GREASE-N2	-	Y	Minimum Serviceable Packing Weight : 40g
B	S020500005A	GREASE-N1	-	Y	Minimum Serviceable Packing Weight : 40g

C. DRAWER (G-TYPE)

DRAWER

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
C	JK75-20102B	MEC-DRAWER G84NPB-7V:4B8C,NO COM	1		Y	
	JK75-20103B	MEC-DRAWER G55NPB-7V:4B8C,NO COM	1		Y	

a. ASS'Y BILL-COIN(5B5C)

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
a	JK95-70336K	MEA-UNIT BILL COIN(5B5C,PLASTIC)	1		Y	
a1	S600200006A	SCREW-TAPPING : M3,L8	3		Y	
a2	JK70-20113A	IPR-HOLDER PLATE(5B5C)	1		Y	
a3	JK70-30045A	SPRING-LEVER PRESS(MD)	4		Y	
a4	JK70-30015A	SPRING-LEVER PRESS(PD)	4		Y	OPTION
a5	JK72-20259A	PMO-LEVER PRESS	4		Y	
a6	JK70-20067A	IPR-LEVER PRESS	4		Y	OPTION
a7	JK72-20742A	PMO-BILL PARTITION	3		Y	
a8	JK72-20741A	PMO-BILL COIN TILL : 4B8C	1		Y	

a. ASS'Y BILL-COIN(4B8C)

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
a	JK95-70336B	MEA-UNIT BILL COIN(4B8C,PLASTIC)	1		Y	
a1	S600200006A	SCREW-TAPPING : M3,L8	3		Y	
a2	JK70-20114A	IPR-HOLDER PLATE(4B8C)	1		Y	
a3	JK70-30045A	SPRING-LEVER PRESS(MD)	4		Y	
a4	JK70-30015A	SPRING-LEVER PRESS(PD)	4		Y	OPTION
a5	JK72-20259A	PMO-LEVER PRESS	4		Y	
a6	JK70-20067A	IPR-LEVER PRESS	4		Y	OPTION
a7	JK72-20742A	PMO-BILL PARTITION	3		Y	
a8	JK72-20088A	PMO-BILL COIN TILL : 4B8C	1		Y	
a9	JK72-20090A	PMO-COIN PARTITION	6		Y	
a10	JK72-20089A	PMO-COIN TILL	1		Y	

b. ASS'Y HOUSING

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
b	JK97-20095J	MEA-UNIT HOUSING(STD,BLK)	1		N	

c. ASS'Y LOCK

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
c	JK97-20093K	MEA-UNIT LOCK(7V)	1		Y	
	JK97-20093L	MEA-UNIT LOCK(7V,COM)	1		Y	
c1	JK59-50019C	SOLENOID-DC: 7V	1		Y	
c2	S600100013A	SCREW-MACHINE: M3,L14	2		Y	
c3	S600300024A	SCREW-TAPTITE: M3,L5	2		Y	
c4	JK39-40301R	CBF HARNESS MICRO S/W	1		Y	
c5	JK70-30043A	SPRING-LOCK LEVER	1		Y	
c6	JK95-70265B	MEC-SUB LOCK	1		N	
c7	JK70-30019A	SPRING-PUSH	1		Y	
c8	S603100012A	PLAIN-WASHER	1		Y	
c9	S600300027A	SCREW-TAPTITE: M5,L10	1		Y	

C. DRAWER (G-TYPE)

d. ASS'Y BOTTOM

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
d	JK97-20096A	MEA-UNIT BOTTOM(5B5C)	1		N	
	JK97-20096B	MEA-UNIT BOTTOM(4B8C)	1		N	
d1	JK70-20115A	IPR-BOTTOM PLATE(5B5C)	1		N	
	JK70-20115B	IPR-BOTTOM PLATE(4B8C)	1		N	
d2	JK75-20068A	MEC-ROLLER(Φ 22)	2		Y	
d3	S600300008A	SCREW-TAPTITE: M3,L6	2		Y	
d4	JK70-10401A	IPR-PLATE GROUND	2		Y	
d5	S600300008A	SCREW-TAPTITE: M3,L6	6		Y	
d6	S600300027A	SCREW-TAPTITE: M5,L10	3		Y	
d7	JK73-11046B	FOOT-RUBBER: BALCK	4		Y	
d8	6002-000234	SCREW-TAPPING: M4,L16	4		Y	
d9	JK70-50093A	PLAIN-WASHER	1		Y	

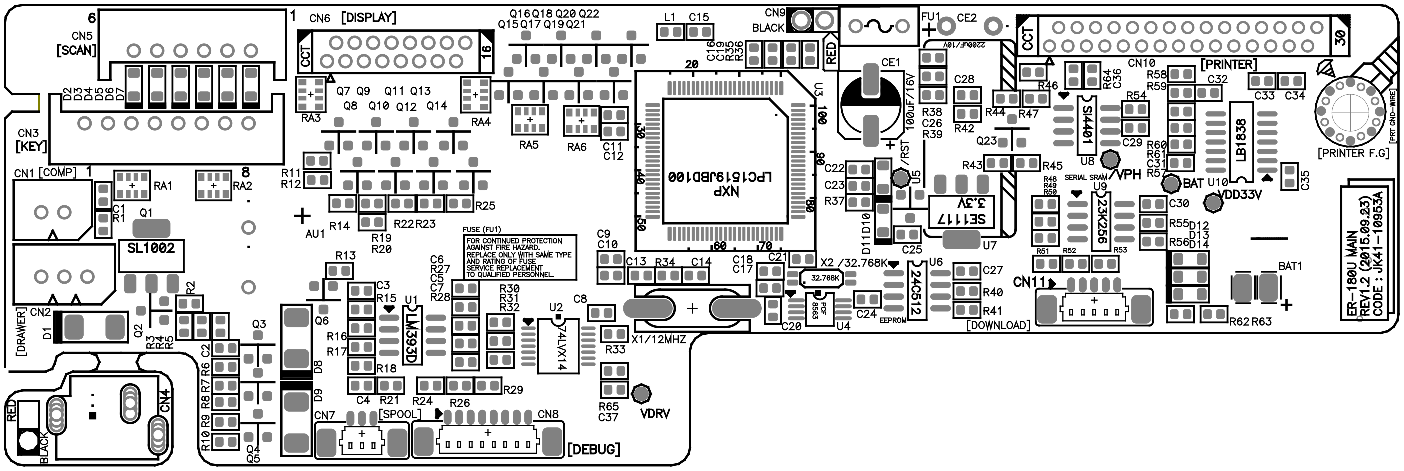
e. ASS'Y TRAY

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
e	JK97-20097E	MEA-UNIT TRAY TILL(5B5C,BLK,UNV)	1		N	
	JK97-20097F	MEA-UNIT TRAY TILL(5B5C,BLK,UNV,MANUAL OPEN)	1		N	
	JK97-20098C	MEA-UNIT TRAY TILL(4B8C,BLK)	1		N	
	JK97-20098D	MEA-UNIT TRAY TILL(4B8C,BLK, MANUAL OPEN)	1		N	
e1	JK73-10010A	RMO-TENSION	2		Y	
e2	JK73-10017A	RMO-SPONGE(UNIVESAL)	2		Y	
e3	JK75-20068A	MEC-ROLLER(Φ 22)	2		Y	
e4	JK70-70150A	ICT-SHAFT PIN	1		Y	
e5	JK70-60041A	RMO-RUBBER STOPPER	2		Y	
e6	S604400003A	RING-E: ID3	1		Y	
e7	JK97-20100A	MEA-TRAY TILL	1		N	
e8	S600300008A	SCREW-TAPTITE: M3,L6	2		Y	
e9	JK70-20314A	IPR-PLATE CLIP	1		Y	
e10	JK70-20108B	IPR-FRONT PANEL(5B5C,BLK)	1		Y	
	JK70-20108D	IPR-FRONT PANEL(4B8C,BLK)	1		Y	
e11	JK70-20025B	IPR-KEY DRAWER	1SET		Y	
e12	JK75-20067A	MEC-KEY LOCK	1		Y	
e13	JK70-50094A	SCREW-TAPTITE: M3,L8	2		Y	
e14	JK70-20075A	IPR-KEY DRAWER: #2424	1SET		Y	OPTION
e15	JK75-20041A	MEC-KEY LOCK: #2424	1		Y	OPTION
e16	JK70-20120A	IPR-DUMMY KEY	1		Y	OPTION
e17	JK70-20074A	IPR-LEVER LOCK	1		Y	OPTION
e18	S604400003A	RING-E: ID3	1		Y	OPTION
e19	JK70-20116A	IPR-LEVER PUSH	1		Y	OPTION
e20	JK70-40905A	ICT-SHAFT LEVER PUSH	1		Y	OPTION
e21	JK70-30020A	SPRING-LEVER PUSH	1		Y	OPTION
e22	S604400006A	RING-E: ID5	1		Y	OPTION

MEMO

6 PCB Layout and Parts List

6-1 MAIN PCB



No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	**JK92-10173A**	**PBA MAIN-BOARD:ER-180U,STD**	1	**ASSY**	**Y**	
-	S0402001189	DIODE-RECTIFIER:S1G-E3,M4,400V	3	D1,D8,D9	Y	
-	S0404001052	DIODE-SCHOTTKY:BAT43WS,BAT54WS,30V	9	D2-D7,D12-D14	Y	
-	S0501000279	TR-SMALL SIGNAL:KSA1182Y,PNP,150mW,SOT23	10	Q3,Q4,Q7-Q14	Y	
-	S0501000457	TR-SMALL SIGNAL:MMBT2222A,NPN,350MW,SOT-	12	Q2,Q5,Q6,Q15-Q23	Y	
-	S0502000400	TR-POWER;SL1002,NPN,3A,10W,SOT-223	1	Q1	Y	
-	S050500008A	POWER MOSFET:Si4401DDY,SOIC,8P	1	U8	Y	
-	S0801001110	IC-CMOS;74LV14A,INVERTER,TSOP,14P	1	U2	Y	
-	S0903001192	IC-CPU:ER-180U,LPC1519,LQFP,100P	1	U3	Y	
-	S1003001234	IC-MOTOR DRIVER:LB1838M,SOP,14P,225MIL,	1	U10	Y	
-	S110300004A	IC-EEPROM;CAT24C512WI-GT3,SOIC8P	1	U6	Y	
-	S1106001238	IC-SERIALSRAM;23K256-I/SN,SOIC8P	1	U9	Y	
-	S1202000164	IC-VOLTAGE COMPARATOR:KA393,SOP,8P,1.27m	1	U1	Y	
-	S1203001772	IC-REGULATOR:SE1117-3.3V,SOT-223,4P	1	U7	Y	
-	S2008000001	R-CHIP:0 OHM,5%,1/10W,1608	1	R52	N	
-	S2008000012	R-CHIP:200 OHM,5%,1/10W,1608	2	R7,R8	N	
-	S2008000013	R-CHIP:220 OHM,5%,1/10W,1608	1	R46	N	
-	S2008000016	R-CHIP:300 OHM,5%,1/10W,1608	2	R62,R63	N	
-	S2008000017	R-CHIP:330 OHM,5%,1/10W,1608	9	R3,R11,R12,R14,R19, R20,R22,R23,R25	N	
-	S2008000026	R-CHIP:1KOHM,1%,1/10W,1608,1%	4	R9,R42,R43,R60	N	
-	S2008000028	R-CHIP:1.5KOHM,1%,1/10W,1608,1%	2	R4,R5	N	

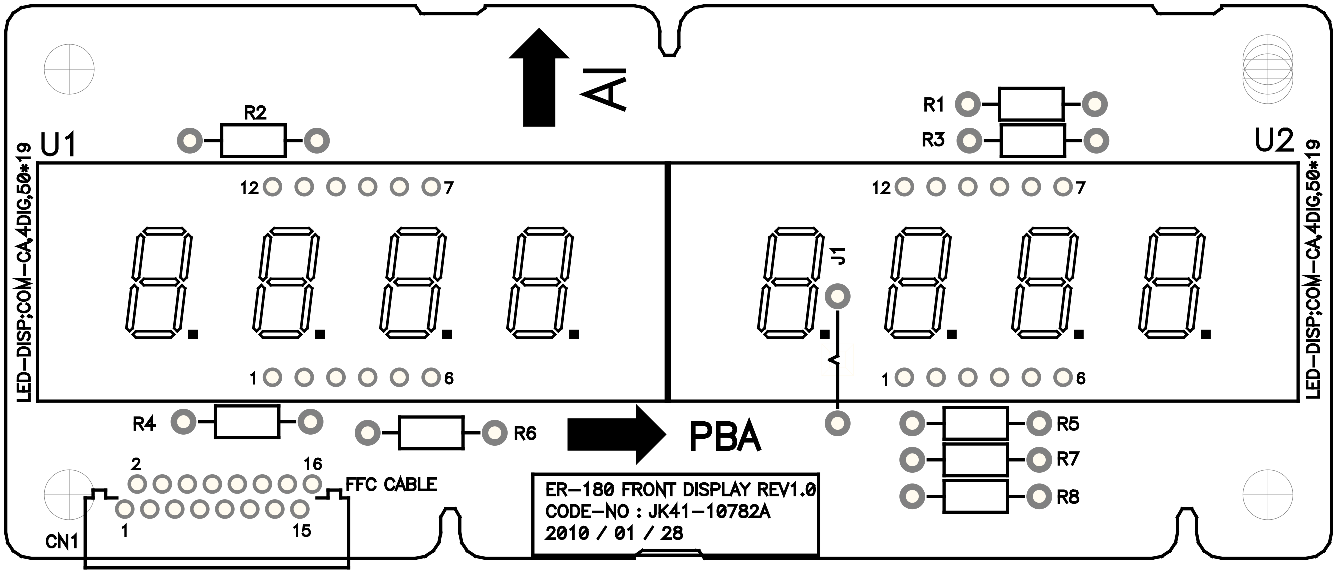
6-1 MAIN PCB

No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	S2008000030	R-CHIP:2KOHM,5%,1/10W,1608	1	R39	N	
-	S2008000037	R-CHIP:4.7KOHM,1%,1/10W,1608,1%	5	R2,R13,R40,R41,R44	N	
-	S2008000044	R-CHIP:10KOHM,1%,1/10W,1608,1%	26	R10,R15-R17,R21,R24, R26,R27,R29-R33, R36,R45,R48-R51, R53-R57,R64,R65	N	
-	S2008000046	R-CHIP:15KOHM,5%,1/10W,1608	1	R58	N	
-	S2008000049	R-CHIP:22KOHM,1%,1/10W,1608,1%	1	R18	N	
-	S2008000056	R-CHIP:47KOHM,1%,1/10W,1608,1%	3	R28,R35,R47	N	
-	S2008000065	R-CHIP:150KOHM,1%,1/10W,1608,1%	2	R38,R59	N	
-	S2008000074	R-CHIP:1MOHM,5%,1/10W,1608	1	R34	N	
-	S2011001100	R-NETWORK;4.7KOHM,5%,1/16W,L,CH	2	RA5,RA6	Y	
-	S2011001101	R-NETWORK;10KOHM,5%,1/16W,L,CH	4	RA1-RA4	Y	
-	S2204000004	C-CERAMIC,CHIP:22pF,5%,50V,1608	4	C13,C14, C18,C21	N	
-	S2204000010	C-CERAMIC,CHIP:100pF,5%,50V,1608	3	C2,C33,C34	N	
-	S2204000015	C-CERAMIC,CHIP:470pF,5%,50V,1608	1	C7	N	
-	S2204000023	C-CERAMIC,CHIP:10nF,10%,50V,X7R,1608	5	C10,C11,C16,C23,C24	N	
-	S2204000028	C-CERAMIC,CHIP:100nF,+80-20%,25V,Y5V,1608	22	C3-C6,C8,C9,C12, C15,C17,C19,C20,C22, C26-C32,C35-C37	N	
-	S2401000700	C-AL:2200uF,20%,10V,RADIAL, ϕ 10*20L	1	CE2	Y	
-	S2402000168	C-AL,SMD:100uF,20%,16V,F60,Ø6.3×5.7L	1	CE1	Y	
-	S280100018A	CRYSTAL-SMD:32.768KHz,20PPM,MC-146	1	X2	Y	
-	S2801003388	CRYSTAL-SMD:12MHz,SX-1,16pF	1	X1	Y	
-	S3002001027	BUZZER-PIEZO:85dB,1.5V,24mA,2.048KHz,BK	1	AU1	Y	
-	S3301002000	CORE-MULTILAYER CHIP BEAD:CB,SMD,1608	1	L1	N	
-	S3601000420	FUSE:250V,4A,SS-5,DIP,2P	1	FU1	Y	
-	S3708000306	CONNECTOR-FFC:6P,1R,2.54mm,ST,BLACK	1	CN5	Y	
-	S3708000327	CONNECTOR-FFC:8P,1R,2.54mm,ST,BLACK	1	CN3	Y	
-	S3708001395	CONNECTOR-FPC/FFC/PIC:30P,1mm,ST,DIP,TOP	1	CN10	Y	
-	S3708001418	CONNECTOR-FFC:16P,1mm,ST,DIP,TOP,IVORY,	1	CN6	Y	
-	S3711004118	WAFER;BOX-HEADER,1R, 3P,1.25mm,SMD	1	CN7	Y	
-	S3711004128	WAFER;BOX-HEADER,1R, 5P,1.25mm,SMD	1	CN11	Y	
-	S3711003968	CONNECTOR-HEADER:BOX,3P,1R,2.5mm,STRAIGH	1	CN2	Y	

6-1 MAIN PCB

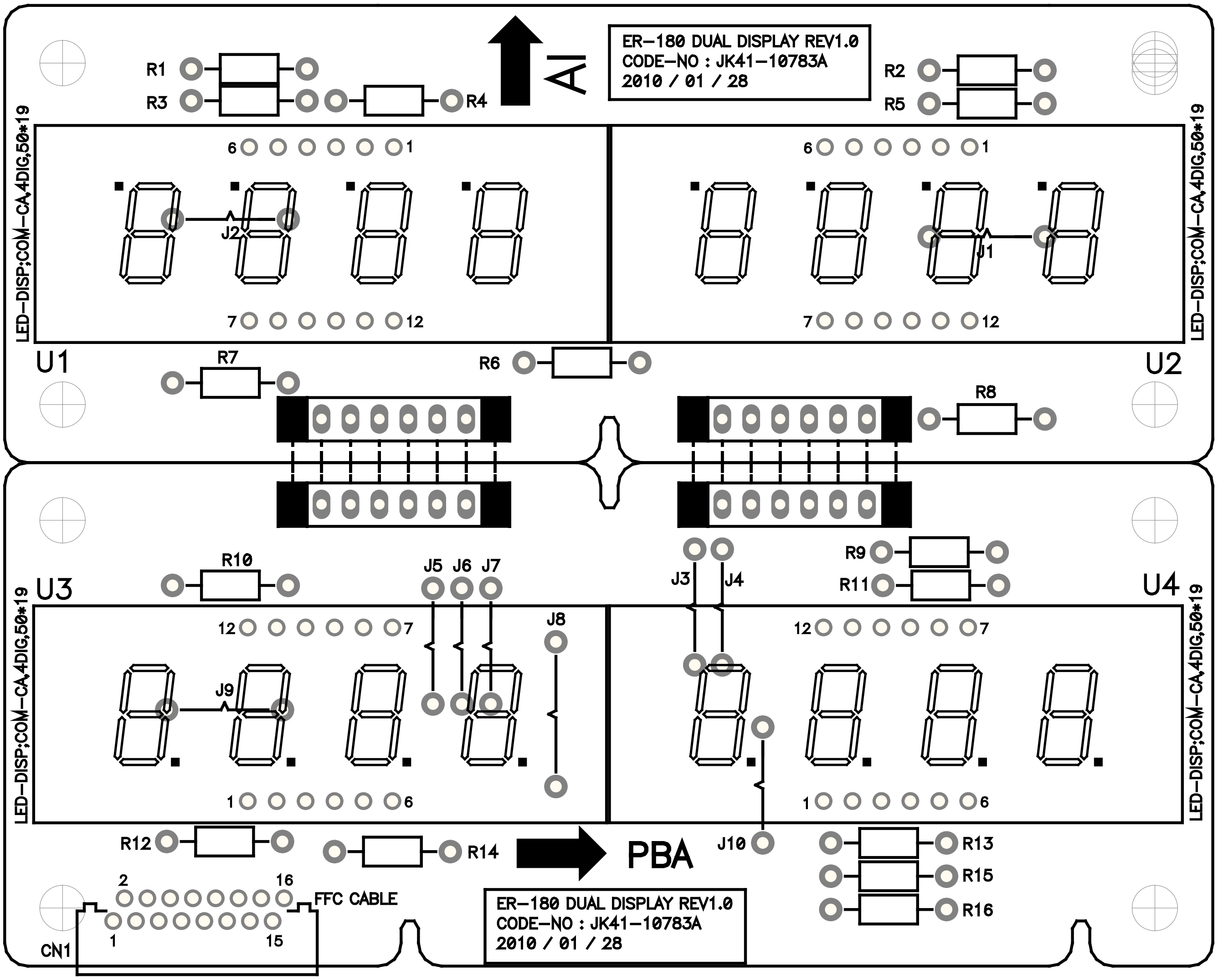
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	S372201050A	JACK-DC POWER:ER-180U,2P,ST,DC-015	1	CN4	Y	
-	S430300005A	BATTERY_MS621F-FL11E,3V,5.5mAh	1	BAT1	Y	
-	JK39-80071A	HARNESS-POWER;ER-180U,2P,280mm,WITH CORE	1	CN9	Y	
-	JK41-10953A	PCB-MAIN:ER-180U,FR-4,2L,T1.6	1	PCB	N	

6-2 FRONT DISPLAY PCB



No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	**JK49-10012A**	**UNIT-FND DISPLAY:ER-180,FRONT**	**1**	**ASSY**	**Y**	
-	3708-001417	CONNECTOR-FFC:16P,1mm,AN,DIP,UPSIDE,IVR,	1	CN1	N	
-	JK07-00018A	DISPLAY-FND:ER180,FND*4,12PIN,Y/G	2	U1,U2	N	
-	2001-000027	R-CARBON:100OHM,5%,1/4W,AA,TP,2.4X6.0MM	8	R1-R8	N	
-	JC39-40511A	CBF HARNESS:ML-80,JUMPER,AWG22,52mm,SILV	1	J1	N	
-	JK41-10782A	PCB-DISPLAY:ER-180,FRONT,FR-1,T1.6	1	PCB	N	

6-3 DUAL DISPLAY PCB

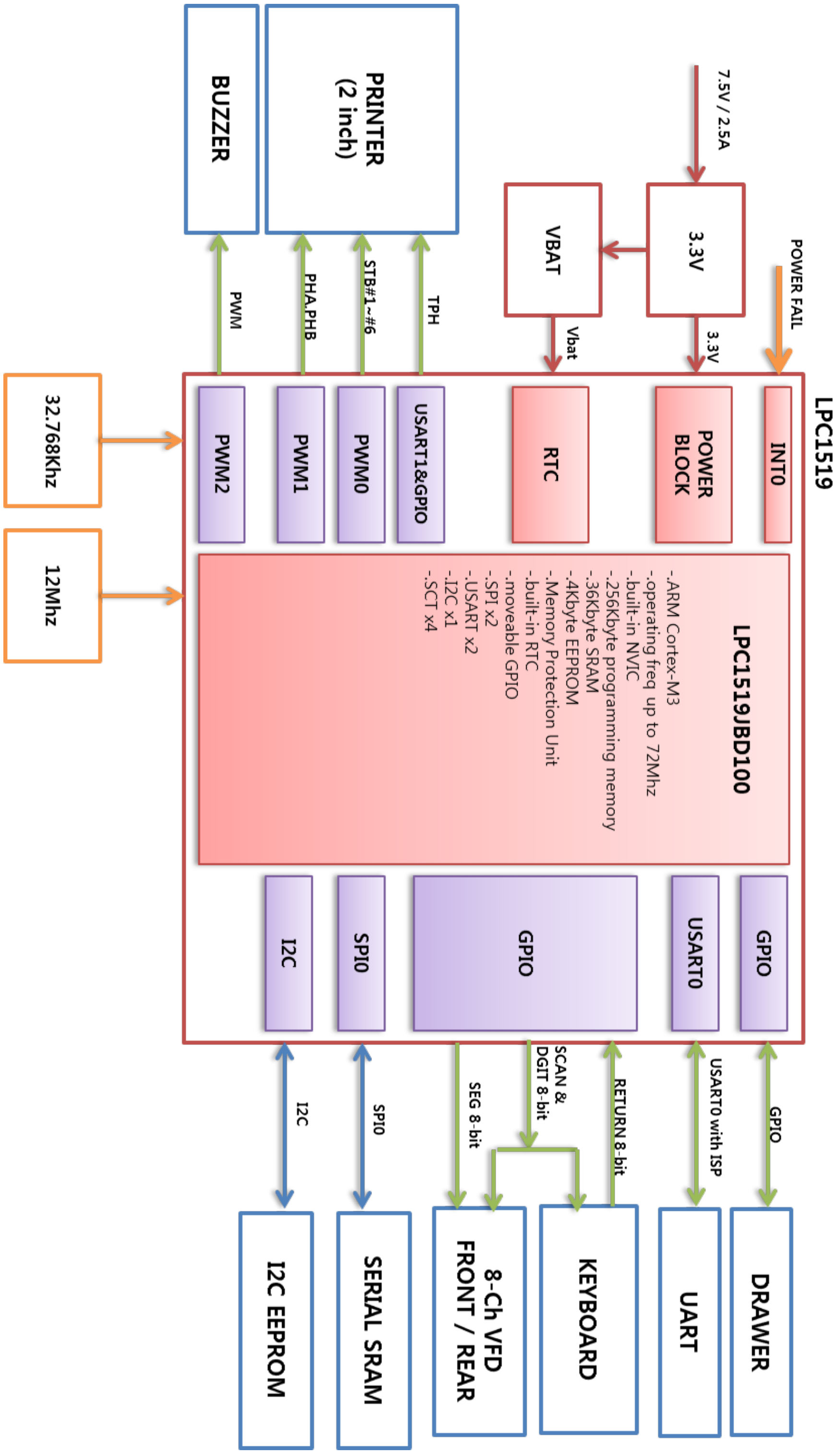


No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	**JK49-10012B**	**UNIT-FND DISPLAY:ER-180,DUAL**	**1**	**ASSY**	**Y**	
-	3708-001417	CONNECTOR-FFC:16P,1mm,AN,DIP,UPSIDE,IVR,	1	CN1	N	
-	JK07-00018A	DISPLAY-FND:ER180,FND*4,12PIN,Y/G	4	U1-U4	N	
-	JK39-40804A	HARNESS-JUMP WIRE:ER180,80mm,8P,DISPLAY	2	DISPLAY HAR.	N	
-	2001-000027	R-CARBON:100OHM,5%,1/4W,AA,TP,2.4X6.0MM	16	R1-R16	N	
-	JC39-40511A	CBF HARNESS:ML-80,JUMPER,AWG22,52mm,SILV	10	J1-J10	N	
-	JK41-10783A	PCB-DISPLAY:ER-180,DUAL,FR-1,T1.6	1	PCB	N	

Memo

7 Block Diagram

7-1 Block Diagram



Memo

8 Schematic Diagram

[Schematics Sheet Content]

1. **MAIN PCB Schematics.**

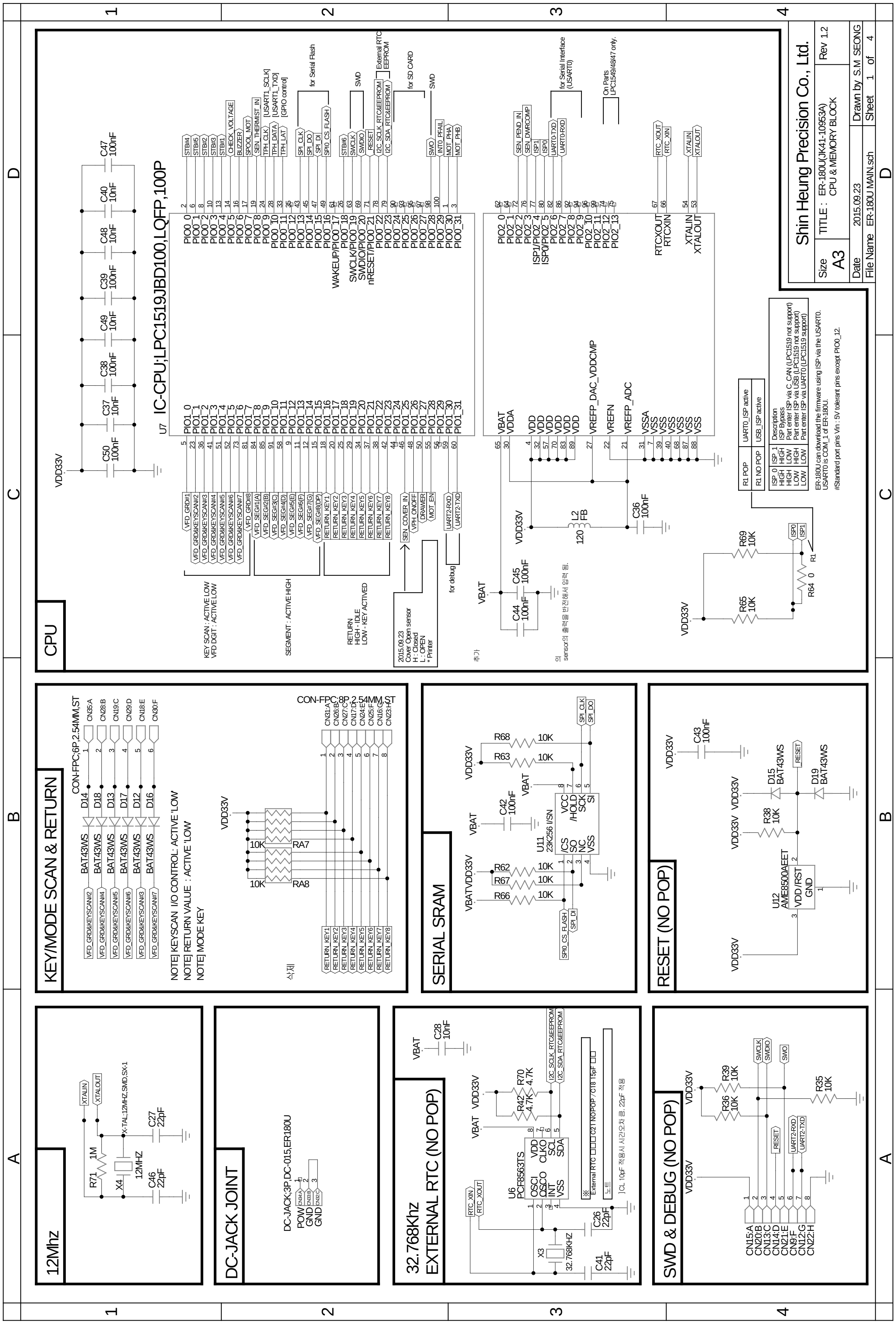
1) CPU / KEY / _RESET / SRAM Part Page 8-2
2) PRINTER / DISPLAY Part Page 8-3
3) DRAWER / P_FAIL / BUZZER Part Page 8-4
4) BATTERY / EEPROM Part Page 8-5

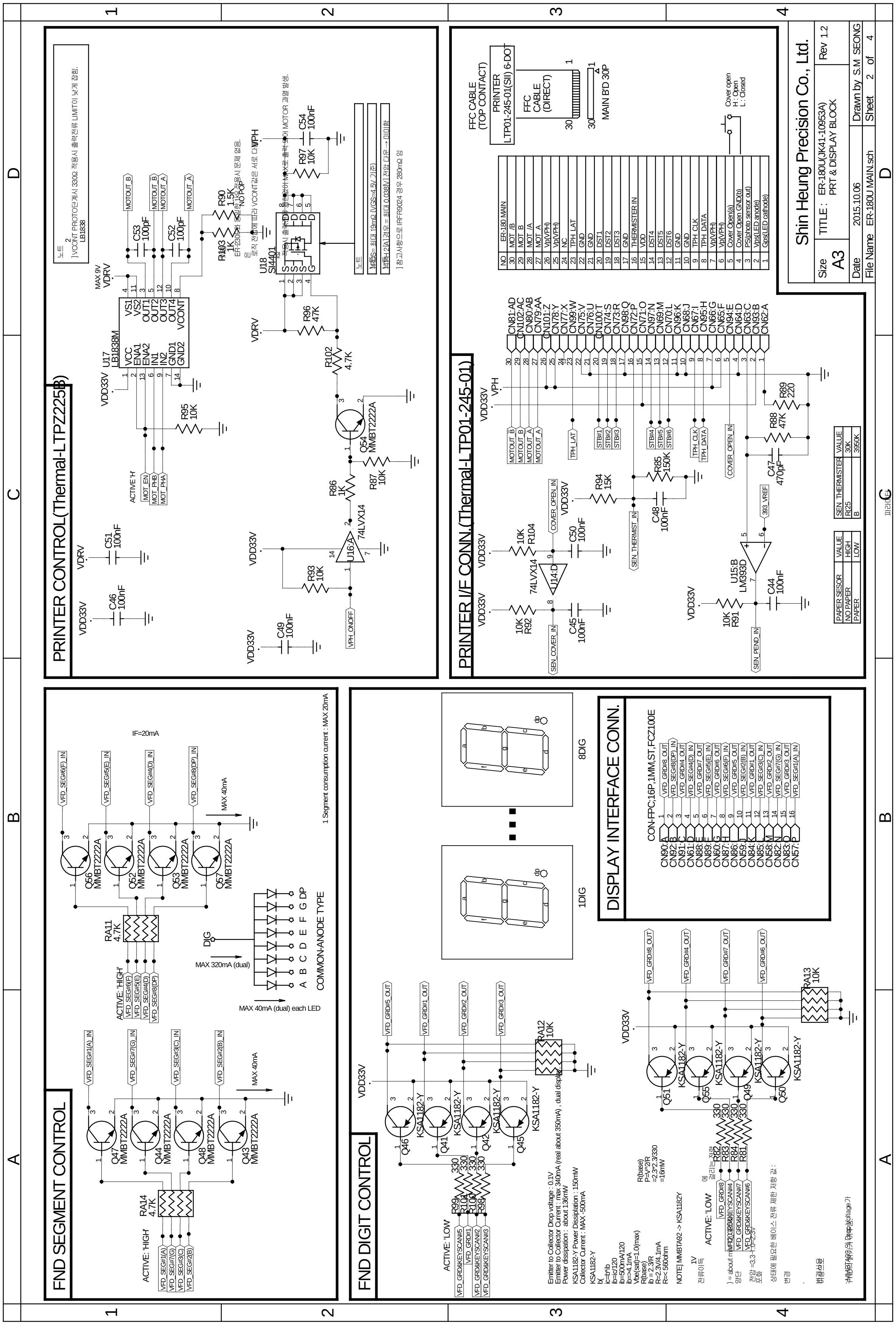
2. FRONT DISPLAY PCB Schematics.

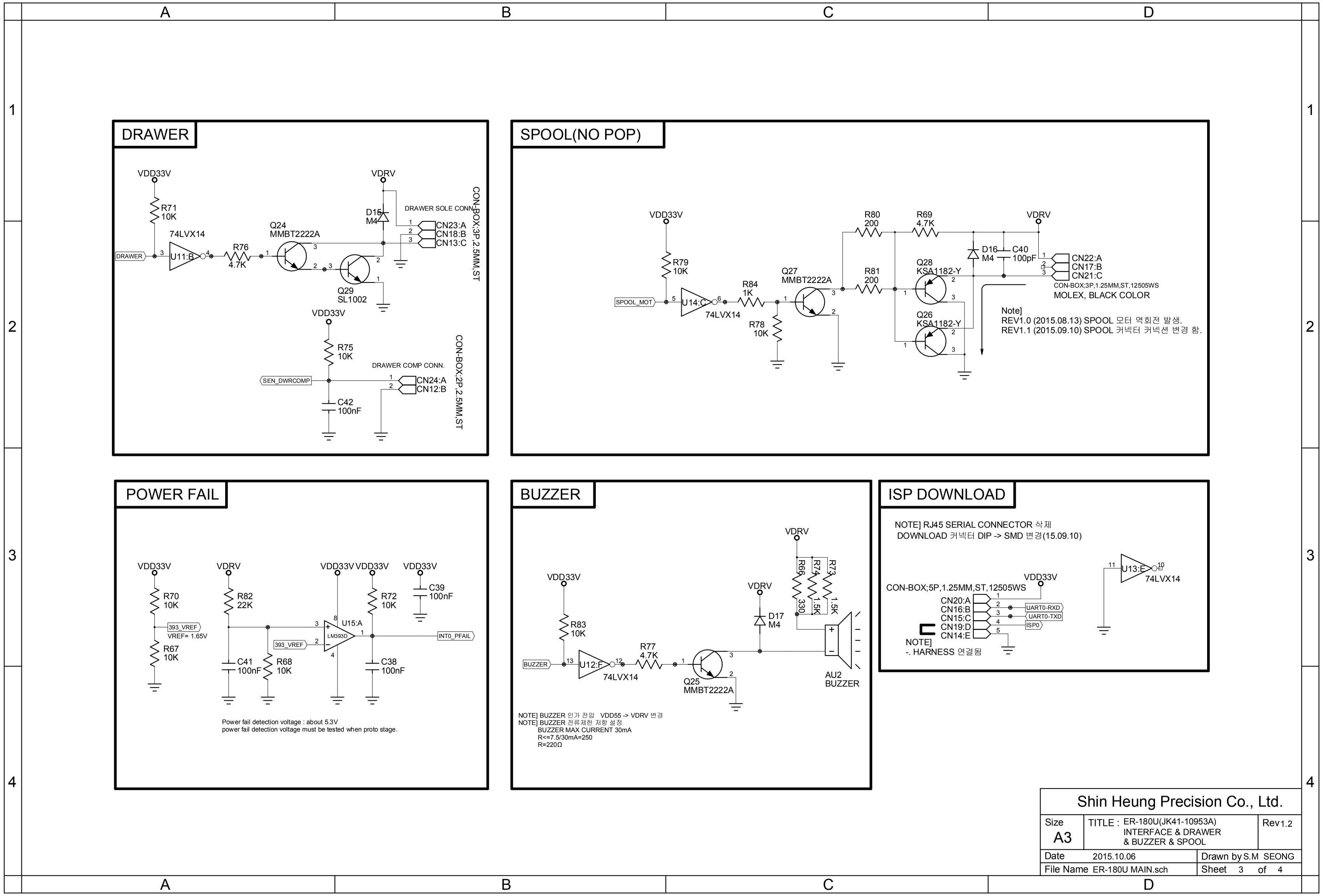
1) FRONT DISPLAY Part Page 8-6

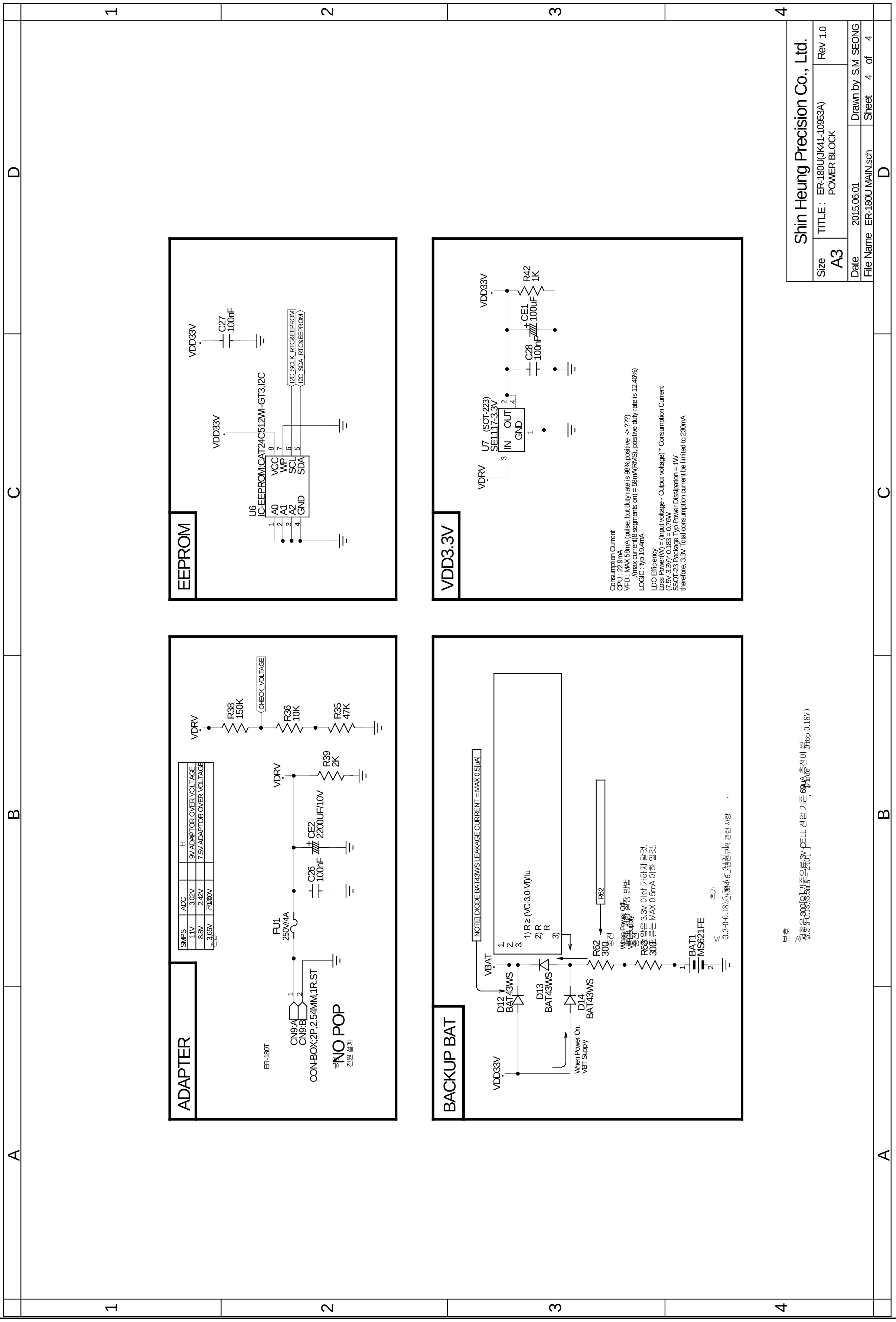
3. DUAL DISPLAY PCB Schematics.

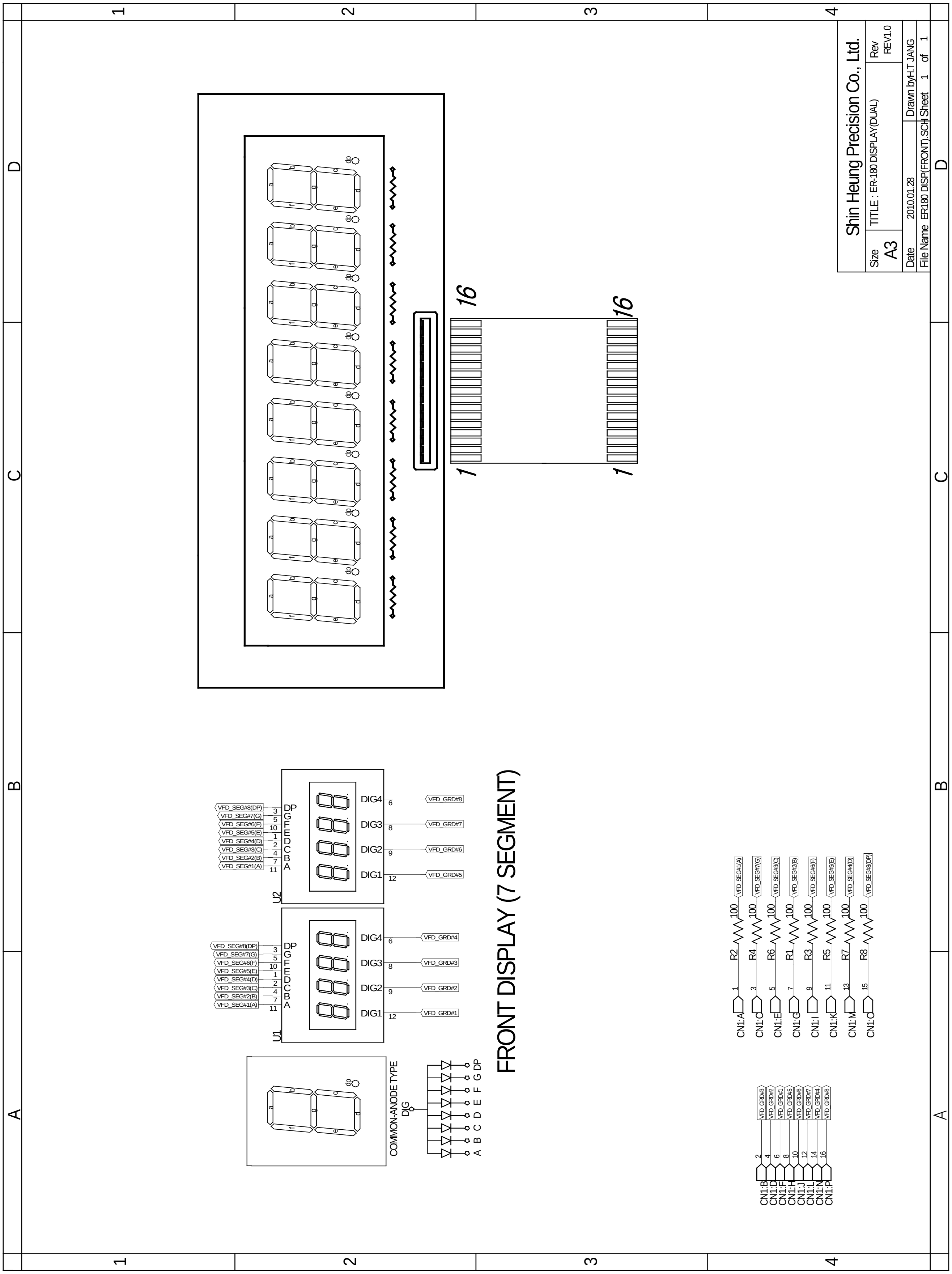
1) DUAL DISPLAY Part Page 8-7

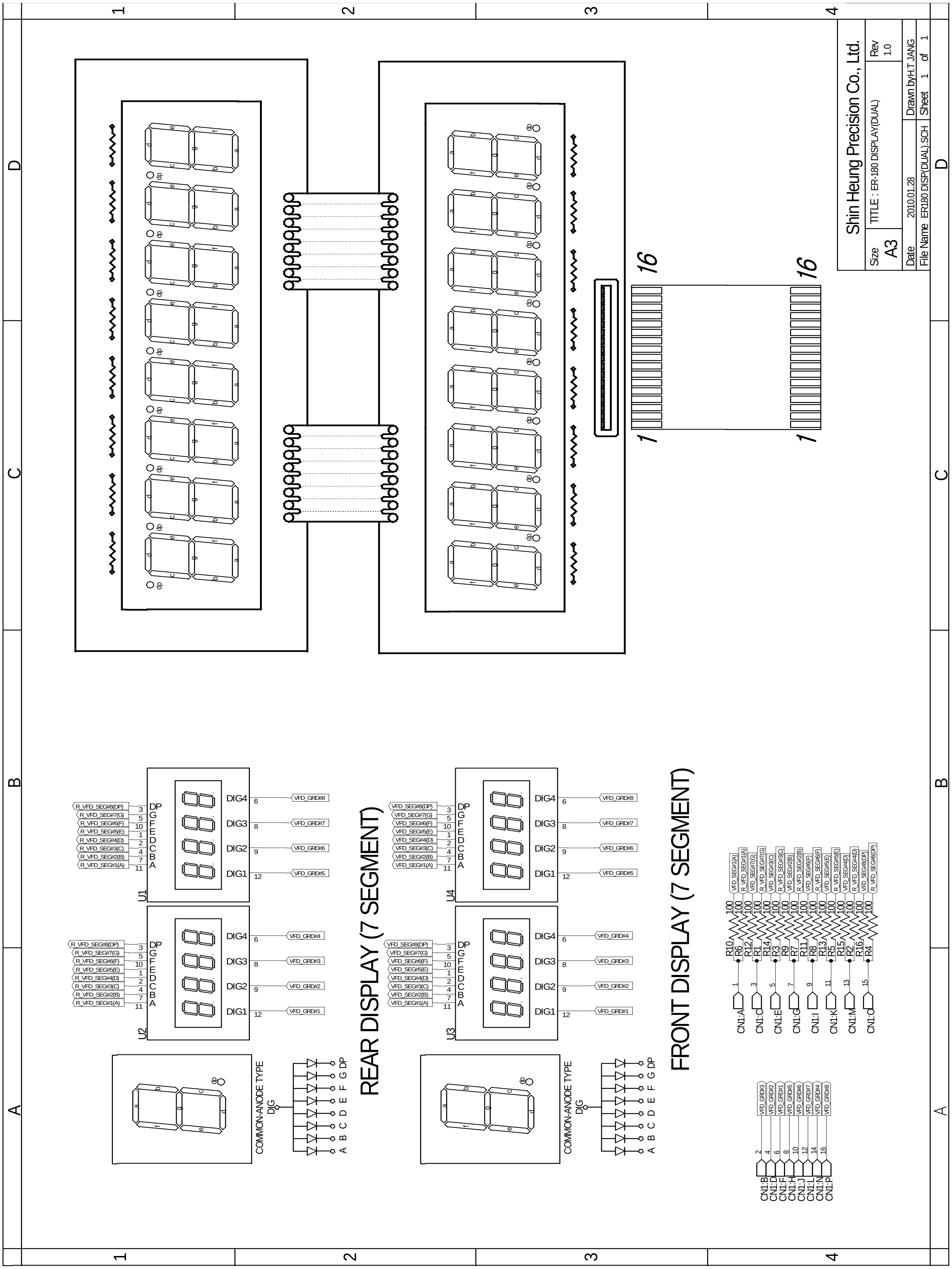

CPU
IC-CPU;LPC1519JBD100,LQFP,100P
U7
KEY/MODE SCAN & RETURN
CON-FPC;6P,2.54MM,ST
CON-FPC;8P,2.54MM,ST
NOTE] KEYSCAN I/O CONTROL: ACTIVE LOW
NOTE] RETURN VALUE : ACTIVE LOW
NOTE] MODE KEY
SERIAL SRAM
U11
23K256 I/SN
RESET (NO POP)
U12
AME8500AEET
12Mhz
X4
12MHZ
X-TAL;12MHz,SMD,SX-1
DC-JACK JOINT
DC-JACK;3P,DC-015,ER180U
32.768Khz
EXTERNAL RTC (NO POP)
U6
PCF8563TS
X3
32.768KHZ
SWD & DEBUG (NO POP)
VDD33V
VBAT
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180U(JK41-10953A)
CPU & MEMORY BLOCK
Rev 1.2
Date 2015.09.23
Drawn by S.M SEONG
File Name ER-180U MAIN.sch
Sheet 1 of 4
R1 POP UART0_ISP active
R1 NO POP USB_ISP active
ER-180U can download the firmware using ISP via the USART0.
USART0 is COM_1 of ER-180U.
#Standard port pins Vin : 5V tolerant pins except PIO0_12.
2015.09.23
Cover Open sensor
H : Closed
L : OPEN
* Printer
for debug
for Serial Flash
for SD CARD
SWD
External RTC
EEPROM
for Serial Interface (USART0)
On Parts LPC1549/48/47 only.
KEY SCAN : ACTIVE LOW
VFD DIGIT : ACTIVE LOW
SEGMENT : ACTIVE HIGH
RETURN
HIGH - IDLE
LOW - KEY ACTIVED
A
B
C
D
1
2
3
4


PRINTER CONTROL(Thermal-LTPZ225B)
PRINTER I/F CONN.(Thermal-LTP01-245-01)
FND SEGMENT CONTROL
FND DIGIT CONTROL
DISPLAY INTERFACE CONN.
CON-FPC,16P,1MM,ST,FCZ100E
LB1838M
SI4401
74LVX14
LM393D
MMBT2222A
KSA1182-Y
COMMON-ANODE TYPE
1DIG
8DIG
FFC CABLE
(TOP CONTACT)
PRINTER
LTP01-245-01(SII) 6-DOT
FFC
CABLE
(DIRECT)
MAIN B'D 30P
Cover open
H : Open
L : Closed
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180U(JK41-10953A)
PRT & DISPLAY BLOCK
Rev 1.2
Date 2015.10.06
Drawn by S.M SEONG
File Name ER-180U MAIN.sch
Sheet 2 of 4


DRAWER
VDD33V
R71 10K
74LVX14
U11:B
DRAWER
R76 4.7K
Q24 MMBT2222A
Q29 SL1002
VDRV
D15 M4
DRAWER SOLE CONN.
CN23:A
CN18:B
CN13:C
CON-BOX;3P,2.5MM,ST
VDD33V
R75 10K
SEN_DWRCOMP
C42 100nF
DRAWER COMP CONN.
CN24:A
CN12:B
CON-BOX;2P,2.5MM,ST
SPOOL(NO POP)
VDD33V
R79 10K
SPOOL_MOT
U14:C
74LVX14
R84 1K
R78 10K
Q27 MMBT2222A
R80 200
R81 200
R69 4.7K
Q28 KSA1182-Y
Q26 KSA1182-Y
D16 M4
C40 100pF
VDRV
CN22:A
CN17:B
CN21:C
CON-BOX;3P,1.25MM,ST,12505WS
MOLEX, BLACK COLOR
Note]
REV1.0 (2015.08.13) SPOOL 모터 역회전 발생.
REV1.1 (2015.09.10) SPOOL 커넥터 커넥션 변경 함.
POWER FAIL
VDD33V
R70 10K
393_VREF
VREF= 1.65V
R67 10K
VDRV
R82 22K
C41 100nF
R68 10K
393_VREF
VDD33V
U15:A
LM393D
VDD33V
R72 10K
C38 100nF
INT0_PFAIL
VDD33V
C39 100nF
Power fail detection voltage : about 5.3V
power fail detection voltage must be tested when proto stage.
BUZZER
VDD33V
R83 10K
BUZZER
U12:F
74LVX14
R77 4.7K
Q25 MMBT2222A
VDRV
D17 M4
VDRV
R66 330
R74 1.5K
R73 1.5K
AU2 BUZZER
NOTE] BUZZER 인가 전압 VDD55 -> VDRV 변경
NOTE] BUZZER 전류제한 저항 설정
BUZZER MAX CURRENT 30mA
R<=7.5/30mA=250
R=220Ω
ISP DOWNLOAD
NOTE] RJ45 SERIAL CONNECTOR 삭제
DOWNLOAD 커넥터 DIP -> SMD 변경(15.09.10)
CON-BOX;5P,1.25MM,ST,12505WS
CN20:A
CN16:B
CN15:C
CN19:D
CN14:E
VDD33V
UART0-RXD
UART0-TXD
ISP0
NOTE]
-. HARNESS 연결됨
U13:E
74LVX14
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180U(JK41-10953A) INTERFACE & DRAWER & BUZZER & SPOOL
Rev1.2
Date 2015.10.06
Drawn by S.M SEONG
File Name ER-180U MAIN.sch
Sheet 3 of 4
A
B
C
D
1
2
3
4


Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180U(JK41-10953A) POWER BLOCK
Rev 1.0
Date 2015.06.01
Drawn by S.M. SEONG
File Name ER-180U MAIN.sch
Sheet 4 of 4
EEPROM
U6
IC-EEPROM;CAT24C512WI-GT3,I2C
A0 A1 A2 GND VCC WP SCL SDA
VDD33V
C27 100nF
I2C_SCLK_RTC&EEPROM
I2C_SDA_RTC&EEPROM
VDD3.3V
U7 (SOT-223) SE1117-3.3V
IN OUT GND
VDRV
C28 100nF
CE1 100uF
R42 1K
Consumption Current
CPU : 22.9mA
VFD : MAX 58mA (pulse, but duty rate is 98%,positive -> ???)
(max current(8 segments on) = 58mA(RMS), positive duty rate is 12.46%)
LOGIC : typ 19.4mA
LDO Efficiency
Loss Power(W) = (Input voltage - Output voltage) * Consumption Current
(7.5V-3.3V)* 0.183 = 0.76W
SSOT-23 Package Typ Power Dissipation = 1W
therefore, 3.3V Total consumption current be limited to 230mA
ADAPTER
ER-180T
CN9:A CN9:B
CON-BOX,2P,2.54MM,1R,ST
NO POP
FU1 250V/4A
C26 100nF
CE2 2200UF/10V
R39 2K
R38 150K
R36 10K
R35 47K
CHECK_VOLTAGE
SMPS | ADC | 비
11V | 3.02V | 9V ADAPTOR OVER VOLTAGE
8.8V | 2.42V | 7.5V ADAPTOR OVER VOLTAGE
3.65V | 1.00V
BACKUP BAT
VDD33V
VBAT
D12 BAT43WS
D13 BAT43WS
D14 BAT43WS
When Power On, VBT Supply
NOTE) DIODE BAT43WS LEAKAGE CURRENT = MAX 0.5(uA)
1) R ≥ (VC-3.0-Vf)/Iu
2) R
3)
R62
R62 30Ω
R63 300Ω
BAT1 MS621FE
When Power Off
3.3V 이상 가하지 말것.
MAX 0.5mA 이하 일것.
3.3-(0.18)/3.3mA = 2K
1
2
3
4
A
B
C
D


Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180 DISPLAY(DUAL)
Rev REV1.0
Date 2010.01.28
Drawn byH.T JANG
File Name ER180 DISP(FRONT).SCH
Sheet 1 of 1
FRONT DISPLAY (7 SEGMENT)
COMMON-ANODE TYPE
DIG
A B C D E F G DP
U1
U2
DP G F E D C B A
3 5 10 1 2 4 7 11
DIG1 DIG2 DIG3 DIG4
12 9 8 6
VFD_SEG#1(A)
VFD_SEG#2(B)
VFD_SEG#3(C)
VFD_SEG#4(D)
VFD_SEG#5(E)
VFD_SEG#6(F)
VFD_SEG#7(G)
VFD_SEG#8(DP)
VFD_GRD#1
VFD_GRD#2
VFD_GRD#3
VFD_GRD#4
VFD_GRD#5
VFD_GRD#6
VFD_GRD#7
VFD_GRD#8
CN1:A 1 R2 100
CN1:C 3 R4 100
CN1:E 5 R6 100
CN1:G 7 R1 100
CN1:I 9 R3 100
CN1:K 11 R5 100
CN1:M 13 R7 100
CN1:O 15 R8 100
CN1:B 2
CN1:D 4
CN1:F 6
CN1:H 8
CN1:J 10
CN1:L 12
CN1:N 14
CN1:P 16
a b c d e f g dp
1
16
1 2 3 4
A B C D


REAR DISPLAY (7 SEGMENT)
FRONT DISPLAY (7 SEGMENT)
COMMON-ANODE TYPE
DIG
U1
U2
U3
U4
DIG1
DIG2
DIG3
DIG4
DP G F E D C B A
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180 DISPLAY(DUAL)
Rev 1.0
Date 2010.01.28
Drawn by H.T JANG
File Name ER180 DISP(DUAL).SCH
Sheet 1 of 1
1
16

UPDATE LOG

Application Date	Page	Part #	Notes (Cause & Solution)	S/Bulletin

Use this page to record any special servicing information such as Service Bulletins or Supplements.
When possible, record changes to Code numbers directly on the actual Parts List.
Always records Service Bulletin numbers and Application Dates on this log to ensure that your data is always as current as possible.

SAM4S

ⓒ Shin Heung Precision. October 2015

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V1.3